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)

MCA Semester III
MCACC 301 - Python Programming

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorial: 15 Hours

OBJECTIVES OF THE COURSE:

1. To acquire programming skills in core Python.
2. To explore the use of data structures, strings, text files, lists and dictionaries.
3. To acquire Object Oriented Skills in Python.
4. To understand to solve the problems with Python database, Python multithreading.
5. To work with Django framework, NumPy and other libraries.

UNIT-I **Lectures: 09**

Introduction, Problem solving: Planning a computer program, Problem solving techniques. History of Python, Need of Python Programming, Applications Basics of Python Programming. Getting started with Python programming- Running code in interactive shell. Input, processing and output. Editing, saving and running Python Scripts. Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT-II **Lectures: 09**

Data Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.
Data Structures-Lists- Operations, Slicing, Methods, Tuples, Sets, Dictionaries, Sequences, Comprehensions.

UNIT-III **Lectures: 09**

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Scope of the Variables in a Function - Global and Local Variables
Object Oriented Design: Design with Classes, Programming types, Object Oriented Programming, Structuring classes with Inheritance and Polymorphism. Case study- request, analysis, design & implementation. Python Regular Expression. **Error and Exceptions:** Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User defined Exceptions.

UNIT-IV **Lectures: 09**

Python Database Interaction: SQL Database connection using Python. Creating and searching tables. Reading and storing config information on database. Programming using database connections.
Python Multithreading: Understanding threads, synchronizing the threads, programming using multithreading.

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)

UNIT-V **Lectures: 09**

Logging in python, **Introduction to Django framework**: Creating a project and application, URLs, models, templates and views files, Introduction to web development, **Introduction to Pycharm**. **Numpy**: Main advantages of Numpy arrays over Python list, Creating arrays.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand and comprehend the Basics of Python programming.	K1, K2
2	CO2. Describe and explain the use of the built-in data structures list, sets, tuples and dictionary.	K2, K3
3	CO3. Make use of functions, modules and its applications.	K2, K3
4	CO4. Demonstrate the principles of OOPs and identify real-world applications using OOPs, files and exception handling provided by Python.	K2, K3
5	CO5. Implement Python Database handling and concepts of Python Multithreading.	K2, K3
6	CO6. Familiarize and be able to use Django framework, Pycharm IDE, Python standard libraries.	K2, K3

Suggested Readings:

1. Kenneth A. Lambert, Martin, Juneja "Fundamentals of Python", Cengage Learning.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
3. Learning Python, Mark Lutz, Orielly.
4. Harsh Bhasin, "Python for Beginners", New Age International.
5. Ashok Namdev Kamthane , Programming and Problem Solving with Python, TMH.
6. Allen Downey, Learning with Python, Dreamtech.

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)

MCA Semester III
MCACC 302: Software Engineering

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To understand the methodologies involved in the development and maintenance of software (i.e.) over the entire life cycle.
2. To learn about generic models of software development process.
3. To understand methods of capturing, specifying, visualizing and analyzing software requirements and analysis modeling.
4. To know basics of testing and understanding concept of software quality assurance and software configuration management process.
5. To understand the different design techniques and their implementation.
6. To learn various testing and maintenance measures.
7. To understand Project management and Quality Assurance plan and measures.

UNIT-I **Lectures: 09**

Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT-II **Lectures: 09**

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.
Software Quality Assurance: (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000Models, SEI-CMM Model.

UNIT-III **Lectures: 09**

Software Design:
Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT-IV **Lectures: 09**

Software Testing: Testing Objectives, UNIT Testing, Integration Testing, 8 Acceptance Testing, Regression Testing, Testing for functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT-V **Lectures: 09**

Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource allocation Models, Software Risk Analysis and Management.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand and comprehend the nature of software development and software life cycle models.	K1, K2
2	CO2. Explain needs for software specifications, software requirements and their gathering techniques and their application.	K2, K3
3	CO3. Understand and comprehend software quality assurance techniques.	K1, K2
4	CO4. Learn and implement concepts of software design modeling and principles.	K1, K2
5	CO5. Compare, understand and learn different testing strategies and tactics.	K1, K2
6	CO6. Understand, compare and apply various software maintenance and management techniques.	K1, K2, K3

Suggested Readings:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Pankaj Jalote, Software Engineering, Wiley.
5. Deepak Jain,"Software Engineering: Principles and Practices", Oxford University Press.
6. Munesh C. Trivedi, Software Engineering, Khanna Publishing House.
7. N.S. Gill, Software Engineering, Khanna Publishing House.
8. Jibitesh Mishra and Ashok Mohanty, Software Engineering: Pearson.

9. Sommerville, I., Software Engineering, Narosa.
10. Fairley, R.E., Software Engineering Concept, Mc-Graw Hill.
11. Shooman, M., Software Engineering, Mc-Graw Hill.
12. Robert N. Charett, Software Engineering Environments, McGraw Hill.

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)

MCA Semester III
MCACC 303: Design and Analysis of Algorithms

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To introduce the basic concepts of Algorithm design.
2. To analyze the complexity of an Algorithm.
3. To develop an understanding of various Algorithm paradigms.
4. Explain fundamental computing algorithms
5. Analyze algorithms and identify key algorithmic strategies
6. Demonstrate knowledge of programming language design issues.

UNIT-I **Lectures: 9**

Introduction, Growth Functions and Recurrences: Role of Algorithms in Computing, Analyzing and designing of algorithms, Mathematical Foundations, Growth Functions-Different Asymptotic Notations, Worst, Average and Best-case Analysis, Recurrences- Substitution, Recursion Tree and Master Methods.

UNIT-II **Lectures: 9**

Brute Force and Divide and Conquer Methods: Brute Force, Exhaustive Search-Travelling Salesman Problem, Knapsack Problem and Assignment problem. Divide and conquer method– Merge sort, Quick sort, Binary search, Strassen's Matrix Multiplication.

UNIT-III **Lectures: 9**

Dynamic Programming, Greedy Techniques and Randomized algorithms: Elements of Dynamic Programming, Assembly Line Scheduling, Matrix Chain Multiplication, Elements of Greedy Algorithms, Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees. Randomized Algorithms**.**

UNIT-IV **Lectures: 9**

Backtracking and Branch and Bound: Introduction, The Eight queen's problem, Knapsack problem, Travelling Salesman problem, Sum of subsets problem. String Matching: Introduction, The naive string-matching algorithm, The Rabin-Karp algorithm

UNIT-V **Lectures: 9**

Complexity Theory and Approximation algorithms: Introduction, P, NP, NP-Hard, NP Complete and Associated Problems, Approximation Algorithm- Vertex Cover and Travelling Salesman-Problem.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1.Identify the problem given and design the algorithm using	K2, K3

	various algorithm design techniques	
2	CO2. Implement various algorithms in a high-level language	K3, K4
3	CO3. Analyze the performance of various algorithms	K2, K4
4	CO4.Compare the performance of different algorithms for same problem	K3
5	CO5.Able to describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NPComplete.	K2, K4

Suggested Readings:

1. Thomas H CormenLeiserson “Introduction to Algorithms”, PHI Learning.
2. Sara Baase and Allen Van Gelder, ComputerAlgorithms: “Introduction to Design and Analysis”, Pearson Education
3. Jon Kleinberg and Eva Tardos “Algorithm Design”, Pearson Education
4. Brassard Bratley “Fundamental of Algorithms”, PHI Learning Private Limited, Delhi India.
5. M T Goodrich “Algorithms Design”, John Wiley
6. Aho, “Design and Analysis of Computer Algorithms”, Pearson Education.
7. Horowitz and Sahani,“Fundamentals of Computer Algorithms”, Galgotia Publications.
8. Tremblay & Sorenson, “An Introduction to Data Structures with Applications”, Mcgraw Hill.
9. J. P. Tremblay and R.B. Bunt, “An Introduction of Computer Science –An Algorithmic Approach”, Tata Mcgraw Hill.

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)

MCA Semester III (Elective-I)
MCAE11: Applied Cryptography

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorial: 15 Hours

OBJECTIVES OF THE COURSE:

1. Understand basics of Cryptography and Learn about how to maintain the Confidentiality, Integrity and Availability of a data.
2. Understand the basics of Mathematics and classical and modern ciphers.
3. Understand various symmetric and asymmetric techniques to protect the message against the threats in the networks.
4. Analyze and implement different hash functions, Message Authentication Codes and digital signature algorithms.
5. Understand the applications of Cryptographic Algorithms in finance, smart cards, cell phones, etc.

UNIT-I **Lectures: 09**

Introduction: History of cryptography, Attacks, Security Services (Confidentiality, Integrity, Availability, Authentication), classical cryptography (shift cipher, monoalphabetic, substitution cipher, polyalphabetic), Encryption a**nd Decryption Techniques, Secure Key, Hashing, Digital signature.**

UNIT-II **Lectures: 09**

Mathematical Background: Integer and Modular Arithmetic, Matrices, Linear Congruence, Groups, Rings, and Fields, GF(p), Euclidean and Extended Euclidean Algorithms, Polynomial Arithmetic, GF(2^n). Random Number Generation, Prime Numbers, Fermat's and Euler's Theorems, Factorization, Chinese Remainder Theorem, Discrete Logarithms.
Symmetric Encryption: Block cipher, modes of operations (e.g., ECB, CBC, OFB, Counter), Stream Cipher, Feistel networks, Data Encryption Standard (DES), Multiple Encryption DES, International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES).

UNIT-III **Lectures: 09**

Asymmetric Encryption: El Gamal, RSA, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange.
Hash Functions: HASH functions and its properties, Real-world examples, Secure Hash Algorithm (SHA), Message Digest - MD5

UNIT-IV **Lectures: 09**

Message Authentication Codes: MAC from Hash functions, MAC from block ciphers.
Digital Signature: Digital signature based on RSA and elliptic curve and python program to generate digital signature.

UNIT-V **Lectures: 09**

Applications of Cryptographic Algorithms: Smart cards, Mobile phone security, Electronic passports and ID cards-SDA/DDA/CDA Bank Cards, Financial Cryptography – Secure Payment Systems, Crypto currencies (Bitcoin).

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Learn to analyze the security of cryptosystems.	K1, K2
2	CO2. Develop the concept of mathematical background and symmetric cryptography techniques.	K2, K3
3	CO3. Analyze the Asymmetric cryptography methods and hash functions.	K3, K4
4	CO4. Implement digital signature and message authentication codes.	K3, K2
5	CO5. Identify and Analyze the applications of cryptographic Algorithms in finance, smart cards, cell phones, etc.	K1, K2

Suggested Readings:

1. D. R. Stinson, Cryptography: Theory and Practice, 3rd Edition. Boca Raton, FL: Chapman & Hall/CRC, 2005. (ISBN No.: 978-1-58-488508-5).
2. W. Stallings, Cryptography and Network Security: Principles and Practice, 5th Edition. Boston: Prentice Hall, 2010. (ISBN No.: 978-0-13-609704-4).
3. J. H. Silverman, A Friendly Introduction to Number Theory, 4th Edition. Boston: Pearson, 2012.
4. C. Kaufman, R. Perlman, and M. Speciner, Network Security: Private Communication in a Public.
5. AtulKahate, Cryptography and Network Security, 2nd ed., Tata McGraw Hill education Private Limited, 2011.
6. Computer Security, Dieter Gollman, 3rd edition, Wiley Publications, 2011.
7. Introduction to Computer Security, Matt Bishop, 1st edition, Addison-Wesley Professional, 2004.
8. Hand Book of Applied Cryptography, by Alfred Menezes, Paul van Oorschot, Scott Vanstone, CRC.

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)

MCA Semester III (Elective-I)
MCAE12: Blockchain Fundamentals

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To provide the overview of the structure of Blockchain and cryptography behind it.
2. To understand the basics of Blockchain Consensus Mechanism.
3. To get overview of digital money and crypto-currencies as Bitcoin.
4. To understand Blockchain implementation platforms as Hyperledger fabric, Ethereum and their components.
5. To discuss and cover both the conceptual as well as application aspects of Blockchain.

UNIT-I **Lectures: 10**

Introduction: Introduction to Blockchain, Blockchain Data structure, Hash chain, distributed database, Index structure, Transactions, Blockchain Architecture and Design: Ledgers, Blocks, Chaining Blocks, Peer to peer systems, centralized and decentralized systems.
Cryptographic Primitives: Cryptographic hash functions – collision free, Hash tree- Merkle Tree, Public Key cryptography, Digital signatures. Use of hash functions and digital signatures in blockchain. Asymmetric-Key Cryptography, Addresses and Address Derivation, Private Key Storage.

UNIT-II **Lectures: 09**

Consensus and multiparty agreements: Requirements for the consensus protocols, Proof of Work (PoW), Scalability aspects of Blockchain consensus protocols, Proof of Work, Proof of Stake, Delegated Proof of Stake, Deposit based consensus, Proof of importance.
Federated consensus or federated Byzantine consensus, Reputation-based mechanisms, Practical Byzantine Fault Tolerance. Permissioned Blockchains: Design goals, Consensus protocols for Permissioned Blockchains.

UNIT-III **Lectures: 08**

Blockchain implementation. Forking-Soft Fork, Hard Forks. Smart contract programming. Blockchain Platforms and Cryptocurrencies - Bitcoin, Litecoin, Ethereum, Ripple. Bitcoin: Basics (Structure of block, creation of coins), Double Spending.

UNIT-IV **Lectures: 09**

Blockchain Platforms: Hyperledger, Ethereum. Architecture. Decomposing the consensus process, Hyperledger fabric components, Chain code Design and Implementation.

UNIT-V **Lectures: 09**

Blockchain applications and case-study: Blockchain in Financial Software and Systems: Settlements, KYC, Blockchain in trade/supply chain, Blockchain for Government: Digital identity, land records and other entities.
Course Outcome: After successful completion of this course students will be able to:

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)

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand and become familiar with concepts of public digital ledger to share information in a trustworthy and secure way.	K1, K2
2	CO2. Interpret the uses of cryptographic techniques in Blockchain.	K1, K2
3	CO3. Explain, distinguish and compare various consensus mechanisms and their concept.	K1, K2
4	CO4.Demonstrate the use of platforms as Hyperledger, Ethereum and its components for implementation.	K2, K3
5	CO5. Analyze the use of Blockchain technology in various domains	K1, K2

Suggested Readings:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Bitcoin and Cryptocurrency Technologies, Princeton University Press
2. Mark Gates, Blockchain ultimate Guide to understanding Blockchain, Bitcoin, Cryptocurrencies, Smart Contracts and Future of money, Wise Fox Publishing
3. Andreas M. Antonopoulos, Mastering Bitcoin - Programming the Open Blockchain, O'Reilly Media, Inc., 2017
4. Imran Bashir, Mastering Blockchain, 2017.
5. Vikram Dhillon, David Metcalf, Max Hooper, Blockchain Enabled Applications, Apress, ISBN No.13:978-1-4842-3081-7.
6. Alex Leverington, Ethereum Programming, Packt Publishing Limited, 2017
7. Roger Wattenhofer, The Science of the Blockchain, CreateSpace Independent Publishing Platform, 2016.
8. Don Tapscott,Alex Tapscott, Blockchain Revolution, ISBN No. 9781101980132
9. Don Tapscott, "Block chain and Crypto currency", 2016. Draft NISTIR 8202, Blockchain Technology Overview - NIST CSRC, 2018.
10. Abhijit Das and VeniMadhavan, C. E., Public-Key Cryptography: Theory and Practice: Theory and Practice, Pearson Education India, 2009.
11. Melanie Swan, Blockchain Blueprint for a new economy, O'Reilly, First Edition, ISBN No.978-1-491-92049-7
12. Mayukh Mukhopadhyay, Ethereum Smart Contract Development, Packt publishing, First Edition, ISBN No.978-1-78847-304-0
13. Chris Dannen, Introducing Ethereum and Solidity, Apress, ISBN No.978-1-4842-2535-6
14. https://www.ibm.com/blockchain/in-en/hyperledger.html.

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)

MCA Semester III (Elective-I)
MCAE13: Privacy & Security in Online Social Media

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To study and understand the use of online social media and networks on the Internet with its exponential increase and is current need of society awareness.
2. To study, investigate and characterize Privacy and security of online social media from various perspectives (computational, cultural, psychological, etc.).
3. To familiarize students with how websites like Facebook, YouTube, LinkedIn, Twitter, Flickr, Instagram, Google+, Four Square, Pinterest, Tinder, and the likes have changed the way the Internet is being used.

UNIT-I **Lectures: 09**

Various privacy and security concerns (spam, phishing, fraud nodes, identity theft) on Online Social Media, Introduction to Social Media API, OSM APIs and tools for data collection, Facebook API. Trust and Credibility on Twitter API.

UNIT-II **Lectures: 09**

Data privacy in the context of social media, Social Tagging Information cascades and socialEpidemics. Rumors and deception in social media, OSM Misinformation on Social Media, Privacy and Social Media. Internet safety, social networking apps. Trust, credibility, and reputations in social systems.

UNIT-III **Lectures: 09**

Crime Prevention - Crime and sense of security - Social control and crime prevention -. Community, Privacy in online data collection, email, searches, online marketing and advertising, social media threats, MySQL, Mongo DB, Crowd sourcing.

UNIT-IV **Lectures: 09**

Policing and Online social Media, Information privacy disclosure, revelation and its effects in OSM and online social networks, Phishing in OSM & Identifying fraudulent entities in online social networks.

UNIT-V **Lectures: 09**

E-Crime on Online Social Media, Social Network Analysis, Weblog analysis, Cyber laws: IT act 2000 overview.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand and become familiar with privacy and security concerns (spam, phishing, fraud nodes, identity	K1, K2

	theft) on Online Social Media	
2	CO2. Acquire knowledge about Social Media API, OSM APIs and other tools for data collection	K1, K2
3	CO3. Acquire knowledge about data privacy on OSM, Internet safety and about trust, credibility, and reputations in social systems	K1, K2
4	CO4. Understand and learn about Policing and Online social Media, Information privacy disclosure and its effects in OSM, phishing in OSM & identifying fraudulent entities in online social networks.	K1, K2
5	CO5. Comprehend and explain about the nature of e-crime on Online Social Media, Cyber laws and Social Network and Weblog analysis,	K1, K2

Suggested Readings:

1. Toby Segaran, "Programming Collective Intelligence: Building Smart Web 2.0 Applications", O'Reilly.
2. Quentin Zervaas, "Practical Web 2.0 Applications with PHP", Apress.
3. Gavin Bell, "Building Social Web Applications: Establishing Community at the Heart of Your Site", O'Reilly.
4. DafyddStuttard, "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws", Wiley.

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)

MCA Semester III (Elective-I)
MCAE14: Mobile Computing

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To develop and fostering interest in the mobility of systems, users, data and computing.
2. To understand the data management issues in mobile environments.
3. To understand the integration of wired and mobile, wireless systems.

UNIT-I **Lectures: 09**

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT-II **Lectures: 09**

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

UNIT-III **Lectures: 09**

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT-IV **Lectures: 09**

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT-V **Lectures: 09**

Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand basics of mobile computing and identify its issues.	K1, K2
2	CO2. Understand and become familiar with wireless telephony concepts, GSM/CDMA and channel allocation, its structure and other details.	K1, K2
3	CO3. Understand and get brief overview of Wireless Networking, Wireless LAN concepts and protocols, WAP architecture and other concepts.	K1, K2

4	CO4.Comprehend and understand data management issues for mobile computers, disconnected operations and adaptive clustering concepts for mobile networks.	K1, K2
5	CO5. Comprehend and understand data management issues for mobile computers, disconnected operations and adaptive clustering concepts for mobile networks.	K1, K2
6	CO6. Describe and comprehend working of Adhoc networks and related protocols.	K1, K2

Suggested Readings:

1. J. Schiller, Mobile Communications, Addison Wesley.
2. A. Mehrotra, GSM System Engineering.
3. M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
4. Charles Perkins, Mobile IP, Addison Wesley.
5. Charles Perkins, Ad hoc Networks, Addison Wesley.

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)

MCA Semester-III (Elective-II)
MCAE21- Cloud Computing

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To analyze the components of cloud computing and its services show how business agility in an organization can be created.
2. To compare and contrast the economic benefits delivered by various cloud models based on application requirements, economic constraints and business requirements.
3. To identify data management, resource management, security and privacy issues in cloud computing.
4. To understand the recent research trends in cloud computing.

UNIT-I **Lectures: 09**

Introduction to Cloud Computing
Overview of Computing, History and Evolution of Cloud Computing, Definition and Essential Characteristics of Cloud Computing, Key Cloud Service Providers and Their Services, Internet of Things in the Cloud, Artificial Intelligence on the Cloud, Blockchain and Analytics in the Cloud,Basics of Parallel and Distributed Computing, Overview of Cloud Delivery Models: Infrastructure as a Service(IaaS), Platform as a Service(PaaS),Software as a Service(SaaS); Overview of Cloud Deployment Models Deployment Models: Public, Private, Hybrid, Community; Cloud Applications,.

UNIT-II **Lectures: 09**

Virtualization and Data Management in Cloud
Virtualization: Virtualization, Benefits of Virtualization, Virtualization Models: Bare metal, Hosted hypervisor, Types of Virtualizations: Processor Virtualization, Memory Virtualization, Full Virtualization, Para virtualization, Device virtualization, Virtual Machines (VM) and its types, VM Migrations.
Data Management: Benefits of Cloud Data Management, Key Capabilities for Cloud Data Management, Cloud data management for healthcare, finance, Data Management Strategy, Data-Vendor Lock-in

UNIT-III **Lectures: 09**

Resource Management (RM) in Cloud Computing
Service Level Agreements (SLAs), Cloud Economics, Resource Management Techniques in Cloud Computing, Energy aware RM Techniques, SLA-aware RM Techniques, Load-Balanced RM Techniques.

UNIT-IV **Lectures: 09**

Cloud Security
Basic Component of Security: Confidentiality, Integrity and Availability, Goals of Security, Security Stack, Data Security and Storage, Identity and Access Management, Cloud Encryption, Security Risk, Access Control, Trust, Reputation.

UNIT-V **Lectures: 09**

Case Study on Open Source and Commercial Clouds, Cloud Simulator, Research trend in Cloud Computing, Fog Computing.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Demonstrate the knowledge of the basic structure, components, features, and various cloud models of cloud.	K1, K2
2	CO2. Illustrate the concept of virtualization, virtual machine and data management in cloud computing.	K1, K2
3	CO3. Identify, compare and examine the several resource management techniques under various quality of service parameters (QoS).	K3, K4
4	CO4. Demonstrate the concept of security component, access control, and risk associated to the cloud computing.	K2
5	CO5. Illustrate the emerging recent research trends and technologies in the field of Cloud Computing.	K1, K2

Suggested Reading:

1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011
2. Enterprise Cloud Computing - Technology, Architecture, Applications, GautamShroff, Cambridge University Press, 2010.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
4. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media
5. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley- India,2010
6. Smith, Jim, and Ravi Nair, "Virtual machines: versatile platforms for systems and processes", Elsevier.
7. Recent conference/journal papers as well as documentation from cloud providers.

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)

MCA Semester-III (Elective-II)
MCAE22- Internet of Things

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. Understand the vision of IoT from a global context.
2. Understand the application of IoT in Industrial and Commercial Building Automation and Real-World Design Constraints
3. Determine the Market perspective of IoT.
4. Use of Devices, Gateways and Data Management in IoT
5. Building state of the art architecture in IoT.Application of.

UNIT-I **Lectures: 09**

INTRODUCTION
Introduction to Internet of Things, Definition and Characteristics of IoT, Physical Design of IoT: Things in IoT, IoT Protocols, IoT Enabled Technologies, Logical Design of IoT, IoT Communication Models, IoT Communication APIs, IoT Levels and Deployment Templates, Domain Specific IoTs: Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

UNIT-II **Lectures: 09**

IoT& M2M
Machine to Machine (M2M), Key Features of M2M, M2M vsIoT, M2M Protocols, Software Defined Networks (SDN), and its BusinessBenefit, Logical View of SDN, Network Function Virtualization (NFV) Architecture, SDN vs NFV, IoT System Management with NETCOZF, YANG- NETCONF, YANG, and SNMP.

UNIT-III **Lectures: 09**

IoT&WSN
Introduction of Wireless Sensor Networks (WSN), WSN Types, WSN Applications, Sensors and its Characteristics in WSN, Security Integration Challenges, Integration Approaches, TCP/IP Adaption, Problems and Solutions in WSN

UNIT-IV **Lectures: 09**

ENABLING TECHNOLOGIES, PROTOCOLS, AND APPLICATIONS
Market Opportunity, IOT Architecture, IoT Elements, IoT Common Standards, QoS Criteria, Io Challenges and Future Directions.

UNIT-V **Lectures: 09**

ENABLING TECHNOLOGIES, PROTOCOLS, AND APPLICATIONS
IoT Ethics and Privacy
Ethical Challenges of the Internet of Things, Importance of the Internet of Things (IoT) in Society, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, Data Aggregation for the IoT in Smart Cities

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand the Definitions, technology, various designs, applications and significance of the Internet of Things.	K1, K2
2	CO2. Illustrate the concept of M2M (machine to machine) with necessary protocols and relationship between IoT and M2M.	K2
3	CO3. Illustrate the constraints and opportunities of wireless and mobile networks for Internet of Things.	K2
4	CO4. Identify the need of IoT, deployment challenges and potential business opportunities of the IoT.	K3
5	CO5. Identify the ethical challenges and privacy requirement in implementing web-based services for IoT.	K3

Suggested Reading:

1. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
2. "Internet of Things: A Hands-on Approach", by ArshdeepBahga and Vijay Madisetti (Universities Press)
3. Recent conference/journal papers.

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)

MCA Semester-III (Elective-II)
MCAE23- Soft Computing

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. Introduce and use the idea of 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: 09**

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: 09**

Neural Network: Biological and Artificial Neuron, Neuron and Firing of Neuron, Activation Functions, Supervised and Unsupervised Learning, Single Layer Perceptron, Multilayer Perceptron, Backpropagation Learning.

UNIT-III **Lectures: 09**

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

UNIT–IV **Lectures: 09**

Fuzzy Logic: Introduction to Fuzzy logic**,** Fuzzy sets and membership functions, Operations on Fuzzy sets, Fuzzificationsdefuzzification's techniques, Fuzzy logic controller design, Some applications of Fuzzy logic and Fuzzy Inference System.

UNIT-V **Lecture: 09**

Evolutionary Computation: Introduction to EC, Overview of other Bio-inspired Algorithms, Swarm Intelligence Algorithms, MOEA Approaches

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	K3, K4

	Solving optimization problems using GAs.	
4	CO4. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.	K3
5	CO5. Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs).	K3

Suggested Readings:

1. An Introduction to Genetic Algorithm, Melanic Mitchell (MIT Press)
2. Evolutionary Algorithm for Solving Multi-objective, Optimization Problems (2nd Edition), 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, 2000.
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.

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)

MCA Semester-III (Elective-II)
MCAE24- Software Testing and Quality Assurance

Credit: 04, IA Marks: 30, ESE Marks: 70
Lectures: 45 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. Building on previous exposure to the fundamentals of the software process
2. This course focuses on techniques for ensuring software quality.
3. quality assurance is viewed as an activity that runs through the entire development process
4. Understanding the needs of clients and users; analyzing and documenting requirements; verifying and validating solutions through testing.
5. To understand the methodologies involved in the development and maintenance of software (i.e.) over the entire life cycle.
6. To learn various testing and maintenance measures.
7. To understand Project management and Quality Assurance plan.

UNIT-I **Lecture -09**

SOFTWARE TESTING FUNDAMENTALS: Introduction; Software Testing Perspective Related Terminology; Myths; Purpose, Goal and Objectives; Challenges and Issues; Effective Software Testing; Types of Testing; Principles of Software Testing; Testing and Debugging, Testability Artifacts Testability Facilitators, Testability Analysis

UNIT-II **Lecture -09**

STATIC TESTING & TESTING STRATEGY: Introduction, Principles of Static Analysis, Static Testing Perspective, General Methodology, A Taxonomy of Static Testing, Manual Techniques, Walkthrough, Formal Reviews, Inspection, Automated Testing, Syntax Parser, Static Verification, Symbolic Execution, Static Vs Dynamic Testing, Strategic Issues Strategic Premises A Generic Testing Strategy Models for Software Testing

UNIT-III **Lecture -09**

BLACK BOX TESTING & WHITE BOX TESTING: Introduction, Black Box Techniques, Equivalence Partitioning, Scope and Prospects, Test Case Generation, Boundary Value Analysis, Robustness Testing, Syntax Testing, Finite State Testing White Box Technique White Box Modeling Basis Path Testing Control Structure Testing Mutation Testing

UNIT-IV **Lecture -09**

SOFTWARE AND QUALITY CONCEPT: Objectives, Quality: An Overview, Software Perspective, Software Quality Factors & Planning Software Quality Assurance, Software Quality Models, Software Quality Measurement and Metrics, Software Quality Assurance Software Quality Assurance Life Cycle Establishing Software Quality Assurance Program SQA Activities

UNIT-V **Lecture -09**

SQA PLANNING & STANDARDS: Building Blocks of Software Quality Assurance Plan, SQA Planning Assurance, Journeyof Standards SQA Standards: Purpose and Role SQA Standards: Requirements and

Activities ISO 9000 Quality Standard Series Software Metrics, Software Quality Metrics Framework, Software Quality Metrics Features, Developments of Software Quality Metrics, Selection of Software Quality Metrics, Quality Models: Hierarchical Models Quality Models: Non- Hierarchical Models, Capability Maturity Models, CMM Maturity Levels.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Outline software testing and software quality assurance principles.	K2, K3
2	CO2. Prepare test case and test suites for completely testing all aspects of a system under test	K5, K6
3	CO3. Concept of quality assurance and quality control techniques and develop a QA plan and Test Plan	K5, K6
4	CO4. To carry out inspections and carry out testing in a production environment	K3
5	CO5.Compile findings of a quality assurance cycle.	K2, K6

Suggested Readings:

1. Software Quality: Concept and Practices, R A Khan, K Mustafa, S I Ahson
2. Software Quality Assurance: From Theory to Implementation, Daniel Galin
3. Metrics and Models in Software Quality Engineering, Stephen H. Kan
4. Quality Assurance: Software Quality Assurance Made Easy, Solis Tech.
5. Aditya P. Mathur, "Fundamentals of Software Testing", Pearson Education.
6. Naik and Tripathy, "Software Testing and Quality Assurance", Wiley
7. K. K. Aggarwal and Yogesh Singh, "Software Engineering", New Age International Publication.
8. John Watkins, Simon Mills, Testing IT: An Off-the-Shelf Software Testing Process, 2nd edition, 2011, Cambridge University Press, ISBN 978-0521148016

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)

MCA Semester III
(Value Added Course)
MCANC01: Cyber Security

Credit: 00, IA Marks: 30, ESE Marks: 70
Lectures: 30 Hours

OBJECTIVES OF THE COURSE:

1. Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an organization.
2. Practice with an expertise in academics to design and implement security solutions.
3. Understand key terms and concepts in Cryptography, Governance and Compliance.
4. Develop cyber security strategies and policies
5. Understand principles of web security and to guarantee a secure network by monitoring and analyzing the nature of attacks through cyber/computer forensics software/tools.

UNIT-I **Lectures: 06**

Introduction- Introduction to Information Systems, Types of Information Systems, Development of Information Systems, Introduction to Information Security and CIA triad, Need for Information Security, Threats to Information Systems, Information Assurance and Security Risk Analysis, Cyber Security.

UNIT-II **Lectures: 06**

Application Security- (Database, E-mail and Internet), Data Security Considerations-(Backups, Archival Storage and Disposal of Data), Security Technology-(Firewall , VPNs, Intrusion Detection System), Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack.

UNIT-III **Lectures: 06**

Introduction to E-Commerce, Threats to E-Commerce, Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, Cryptography Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets - Access Control, CCTV, Backup Security Measures.

UNIT-IV **Lectures: 06**

Security Policies- Why policies should be developed, Policy Review Process, Publication and Notification Requirement of policies, Types of policies – WWW policies, Email Security policies, Corporate Policies, Sample Security Policies. Case Study – Corporate Security.

UNIT-V **Lectures: 06**

Information Security Standards-ISO, IT Act, Copyright Act, IPR. Cyber Crimes, Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law, Copy Right Law, Semiconductor Law and Patent Law, Software Piracy and Software License.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1.Identify and analyze nature & inherent difficulties in the security of the Information System.	K3

2	CO2. Analyze various threats and attacks, corresponding counter measures and various vulnerability assessment and security techniques in an organization.	K3
3	CO3. Applications of cyber based policies and use of IPR and patent law for software-based design.	K1, K2
4	CO4 . Define E-commerce types and threats to E-commerce	K2
5	CO5. Explain concepts and theories of networking and apply them to various situations, classifying networks, analyzing performance	K2, K4

Suggested Readings:

1. William Stallings, “Cryptography and Network Security”, Pearson Education/PHI, 2006.
2. V.K. Jain, “Cryptography and Network Security”, Khanna Publishing House.
3. Gupta Sarika, “Information and Cyber Security”, Khanna Publishing House, Delhi.
4. AtulKahate, “Cryptography and Network Security”, McGraw Hill.
5. V.K. Pachghare, “Cryptography and Information Security”, PHI Learning
6. Nina Godbole, “Information System Security”, Wiley
7. Bothra Harsh, “Hacking”, Khanna Publishing House, Delhi
8. The basic of Hacking and Penetration testing, second edition on ethical hacking and penetration by Patrick Engebretson
9. The web application hacker’s handbook and LAB manual by Wiley

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)

MCACC 304: Lab: Python Programming

Credit: 02, IA Marks: 30, ESE Marks: 70

OBJECTIVES OF THE COURSE:

1. To learn programs for solving problems in Python, handling Strings and text-files, implementing data structures as List and Dictionaries.
2. To learn programs for implementing concepts of Object-Oriented Design.
3. To write programs for database handling, logging and multithreading in Python.
4. To learn implementation using Django framework.
5. To learn programs to be able to use Python Standard libraries as NumPy.

Programming exercise in Python:

- Problem solving, Strings and Text Files. List and Dictionaries.
- Object Oriented Design
- Python Database Interaction
- Python Multithreading
- Logging in python
- Introduction to Django framework
- NumPy

Note: The Instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Write and execute programs for solving basic problems using Python	K3
2	CO2. Write programs for handling Strings, text-files, implementing data-structures as dictionaries and lists.etc.	K3
3	CO3. Write programs for implementing concepts of Object-oriented design.	K3
4	CO4. Write programs using Database interaction/ operations, logging and multi-threading.	K3
5	CO5. Implement programs using Django framework and standard Python libraries.	K3

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)

MCACC 305: Lab: Minor Project (Software/ Research)

Credit: 02, IA Marks: 30, ESE Marks: 70

OBJECTIVES OF THE COURSE:

1. To help students develop openness to new ideas in computer science.
2. To 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.
3. To help students develop a research project.
4. 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.)

Minor-Project using Web Engineering Tools: Design and Implementation of Web Applications, Web Services, Mobile Applications etc. Students are required to incorporate the followings: Dynamic Pages, Adding Dynamic Functionality Interactive User Interface Database in the back-end XML and Databases Provision for EDIs Adding Security Features, etc.

For developing the project, students may use the followings:

.NET Platform, J2EE Platform, Eclipse JAVA, C#, VC++, etc. XML, DHTML, CGI, CSS, PHP &MySQL, Scripting Languages (JSP, ASP), or Suitable Technologies.

OR

Research Project.

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

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Design and develop mini-project following proper software development life-cycle.	K3, K4
2	CO2. Demonstrate capacity to develop research project, apply and evaluate methodologies throughout the project	K3, K4