



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Session: 2020-2021

Name of College:	Uttaranchal Institute of Management
Name of Department:	Department of Computer Applications
Program Name:	Master of Computer Applications (MCA)
Program Code:	20

Program Educational Objectives- PEO, Program Specific Outcomes- PSO, Program Outcomes-PO, Course Outcomes-CO

Program Educational Objectives (PEO)

PEO-1	To solidify foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development.
PEO-2	To prepare the students as successful professionals ready for Industry, Government sectors, Academia, Research, Entrepreneurial Pursuit and Consultancy firms
PEO-3	To prepare the graduates to adapt themselves for life-long learning through professional activities on latest technology and trends needed for a successful career
PEO-4	To inculcate professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.
PEO-5	To prepare students the ability to gain multidisciplinary knowledge through real-time projects and industry internship training and providing a sustainable competitive edge in R&D and meeting industry needs

Program Outcomes-(PO)

PO-1	Understand basic computer application concepts and acquire problem solving skills to develop software required in various multidisciplinary setups.
PO-2	Identify, formulate and analyze computing problems using fundamental concepts of mathematics, computer science and research.
PO-3	Develop leadership skills and analytical reasoning for solving real-time critical problems
PO-4	Understand the impact of professional IT solutions in societal contexts and work for sustainable development.
PO-5	Develop competent technical writing skills, design documentation and make effective presentation using appropriate supporting technologies.
PO-6	Enhance project-based learning skills, such as to define the problem, identify alternative solutions, plan the project, execute the plan, monitor and control the project progress for successful completion of the project.
PO-7	Develop competent skills required by the IT professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms.
PO-8	Strengthen the independent and life-long learning for continued professional development



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- I

Course Name: Design and Analysis of Algorithm

Course Code (CC): MCA-C101

MCA-C101-CO-1	Argue and analyze the correctness of time and space complexity of algorithms.
MCA-C101-CO-2	Device and analyze the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm.
MCA-C101-CO-3	Design and synthesize the solution of optimization problems using Dynamic Programming and Greedy algorithm design techniques and therefore develop technical skills by analyzing them.
MCA-C101-CO-4	Device and analyze the usage of algorithms under several categories like sorting algorithms and string matching algorithms which develop technical and logical skills.
MCA-C101-CO-5	Able to understand major graph algorithms and tree structures, analyse them and able to employ these to model engineering problems, when appropriate.

Semester- I

Course Name: Programming in Java

Course Code (CC): MCA-C102

MCA-C102-CO-1	Understand the Concept of Java Programming to design and develop console based applications to solve mathematical and small business problems using Exception Handling and Multithreading, interface and inheritance.
MCA-C102-CO-2	Understand the concept of AWT, Applet, to design and develop GUI Applications
MCA-C102-CO-3	Understand the concept of Java programming to design Event handling supported enrich GUI applications using Java Swing
MCA-C102-CO-4	Understand the concept of JavaFX and JDBC to implement the solution for real time problems.
MCA-C102-CO-5	Understand the concepts of Java Servlet to design and develop database supported web applications



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- I

Course Name: Advanced Database Management System

Course Code (CC): MCA-C103

MCA-C103-CO-1	Understand the fundamentals of DBMS and conceptual design using EER model with prerequisite.
MCA-C103-CO-2	Understand differences between OODBMS and ORDBMS with their various features.
MCA-C103-CO-3	Learn the concepts of distributed database with their architectures and concepts.
MCA-C103-CO-4	Learn how to retrieve information and analysis of data using PL/SQL.
MCA-C103-CO-5	To understand the concepts of advanced databases such as Gnome databases, deductive databases etc.

Semester- I

Course Name: Software Engineering and Project Management

Course Code (CC): MCA-C104

MCA-C104-CO-1	Compare and evaluate various Software Development Life Cycle Models and solve Engineering problems to Design and Implementation of Software Systems.
MCA-C104-CO-2	Apply new Engineering Technologies like Agile to develop Quality Software which customer requirements within budget and allotted time period.
MCA-C104-CO-3	Apply various Testing Techniques, Metrics and Strategies for the development of Projects.
MCA-C104-CO-4	Proficiently apply CMM standards, CASE tools and COCOMO Cost Estimation Tech Engineering Software Projects.
MCA-C104-CO-5	Be able to develop high-quality software that meets the Organization need and evaluate of their solutions in a global and societal context.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- I

Course Name: Computer Organization and Architecture

Course Code (CC): MCA-C105

MCA-C105-CO-1	Understand the basic organization of modern computer systems and how computer programs are organized, stored, and executed at the machine level.
MCA-C105-CO-2	Analyze and evaluate computer performance and understand how instruction pipelining enhances processor performance.
MCA-C105-CO-3	Understand the basic organization of the memory hierarchy and its applicability.
MCA-C105-CO-4	Analyze the pipeline and vector processing with respect to the design of modern processors.
MCA-C105-CO-5	Distinguish the organization of various parts of a system memory hierarchy.

Semester- I

Course Name: Automata Theory

Course Code (CC): MCA-C106

MCA-C106-CO-1	Understand and apply acquired fundamental knowledge of automata theory to formulate various models/machine for solving real time mathematical problems.
MCA-C106-CO-2	Apply concepts of formal computation and its relationship with languages to evaluate the validity of any token in a programming language through designed DFA or NFA model/machine
MCA-C106-CO-3	Classify and critically evaluate various types of ambiguous and non-ambiguous grammar and thus analyze, formulate the syntax of various programming languages through designing solutions using Push Down Automata
MCA-C106-CO-4	Critically analyze the mathematical problem and Design solution to solve it using Turing Machine.
MCA-C106-CO-5	Evaluate the mathematical problem on solvability, decidability, finiteness and provide solution to PCP problems.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- I

Course Name: Career Skills-I

Course Code (CC): MCA-A107

MCA-A107-CO-1	Solve campus placements aptitude papers covering Logical Reasoning and quantitative aptitude.
MCA-A107-CO-2	Formulate the problem quantitatively and use appropriate arithmetical, and/or statistical methods to solve the problem.
MCA-A107-CO-3	Interpret quantitative information(i.e., formulas, graphs, tables, models, and Schematics) and draw implications from them.
MCA-A107-CO-4	Thinking critically and applying basic mathematics skills to interpret data, draw conclusions, and solve problems and developing proficiency in numerical reasoning
MCA-A107-CO-5	Develop lateral thinking to analyze and solve the problem.

Semester- I

Course Name: Soft Skills-I

Course Code (CC): MCA-A108

MCA-A108-CO-1	Understand the soft skills and effective professional communication
MCA-A108-CO-2	Demonstrate Interview Skills
MCA-A108-CO-3	Acquire Industrial Etiquette
MCA-A108-CO-4	Understand Professional grooming traits.
MCA-A108-CO-5	Acquire written and spoken skills in English Language including Presentation.

Semester- I

Course Name: Design and Analysis of Algorithm Lab

Course Code (CC): MCA-C151

MCA-C151-CO-1	Implement a variety of algorithms such as sorting, graph related, dynamic, etc., in a high level language.
MCA-C151-CO-2	Analyze and compare the performance of algorithms using language features.
MCA-C151-CO-3	Able to implement Quick sort, Merge sort, and other sorting algorithms.
MCA-C151-CO-4	Able to implement programs to solve problems using algorithm design techniques such as Divide and Conquer. Dynamic programming and Greedy programming.
MCA-C151-CO-5	Able to implement different graph algorithms and their analyses.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- I

Course Name: Programming in Java Lab

Course Code (CC): MCA-C152

MCA-C152-CO-1	Implement console based applications to solve mathematical and business problems using Exception Handling, Inheritance, Multithreading.
MCA-C152-CO-2	Design Java programs to implement small GUI applications to solve real world problems.
MCA-C152-CO-3	Design and Develop GUI applications with event handling and Swing and RegEx support to solve real life problems.
MCA-C152-CO-4	Implement enrich GUI applications with database support using JavaFX to solve real world problems.
MCA-C152-CO-5	Develop technical knowledge to design dynamic web applications using JDBC and Servlet.

Semester- I

Course Name: Advanced Database Management System Lab

Course Code (CC): MCA-C153

MCA-C153-CO-1	Understand the fundamentals of DBMS and conceptual design using EER model with prerequisite.
MCA-C153-CO-2	Understand differences between OODBMS and ORDBMS with their various features.
MCA-C153-CO-3	Learn the concepts of distributed database with their architectures and concepts.
MCA-C153-CO-4	Learn how to retrieve information and analysis of data using PL/SQL.
MCA-C153-CO-5	To understand the concepts of advance databases such as Gnome databases, deductive databases etc

Semester- I

Course Name: Mini Project-I

Course Code (CC): MCA-S154

MCA-S154-CO-1	Define the problems in various domains that can be solved using computer applications.
MCA-S154-CO-2	Develop the ability to identify alternative solutions and plan the project.
MCA-S154-CO-3	Analyze and Design the software development process.
MCA-S154-CO-4	To develop coding and testing skills for software development.
MCA-S154-CO-5	Build technical presentation skills and Create project documentation of the complete process.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Responsive Web Applications

Course Code (CC): MCA-C201

MCA-C201-CO-1

Understand to combine web technologies fundamentals of java script, document object model and apply them to develop AJAX applications or formulate solutions.

MCA-C201-CO-2

Recognize the basic concepts of JSON technology, apply JSON to create website to solve problem of fetching data.

MCA-C201-CO-3

Demonstrate problem solving ability to design and develop rich applications with the integration of Web API and Java Script object notation.

MCA-C201-CO-4

Design and develop effective application with the help of session management techniques and enhance security.

MCA-C201-CO-5

Enhance web development skills with the understanding and applications of collaborative web technologies to develop solutions and create employability

Semester- II

Course Name: Functional Programming Using Python

Course Code (CC): MCA-C202

MCA-C202-CO-1

Understand the basis of Python to implement the solutions for various data structure Problems

MCA-C202-CO-2

Design and develop Object Oriented support and database enables application to solve real world problems.

MCA-C202-CO-3

Understand the application of Numpy and use them to solve real world data analysis problems.

MCA-C202-CO-4

Understand the basics of Pandas and apply for solving real world problems.

MCA-C202-CO-5

Ability to implement the solutions for real world problems with Numpy, Pandas and Matplotlib



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Data Communication and Computer Networks

Course Code (CC): MCA-C203

MCA-C203-CO-1	Understand and apply acquired fundamental knowledge of digital data Communication techniques and its standards.
MCA-C203-CO-2	Determine, explicate and analyze problems using fundamental concepts of Computer Networks and suggest new ways to solve the problem.
MCA-C203-CO-3	Inspect the various concepts of network topologies, components and categories of networks to enhance the employability status.
MCA-C203-CO-4	Make use of the concepts of OSI layers, functions and its protocols to examine challenges in Computer Networks.
MCA-C203-CO-5	Build skills in Computer Networks to enhance competitive skills and lifelong learning in the broadest context of technological change.

Semester- II

Course Name: Data Warehousing and Data Mining

Course Code (CC): MCA-C204

MCA-C204-CO-1	Understand the elementary concepts, pros & cons and implications related to data warehouse and data mining.
MCA-C204-CO-2	Understand and illustrate the role of classification and prediction using e.g. Bayesian classifier.
MCA-C204-CO-3	Understand the working of different data warehouse models and allied components.
MCA-C204-CO-4	Develop critical thinking skills to select a set of feasible techniques for domain specific data mining.
MCA-C204-CO-5	Evaluate and organize the unlabeled data using suitable clustering techniques.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Research Methodology and IPR

Course Code (CC): MCA-C205

MCA-C205-CO-1	Understand the various types of research methodologies used to identify/analyze a problem and thus formulate the problem statement using various research components.
MCA-C205-CO-2	Develop technical writing skills and ability to present the inferred knowledge through rigorous literature review using modern tools and soft skills.
MCA-C205-CO-3	Develop competent research skills and thus enhance technical knowledge and make them employable.
MCA-C205-CO-4	Critically analyze the interpreted result of designed model of existing problem using Applications of research components and propose alternative solutions.
MCA-C205-CO-5	Demonstrate the awareness to follow plans for learning, documenting new things keeping IPR in consideration and thus enhances employable and competitive skills.

Semester- II

Course Name: Soft Computing

Course Code (CC): MCA-E206

MCA-E206-CO-1	Analyze the genetic algorithms and their practical applications.
MCA-E206-CO-2	Analyze fuzzy sets, fuzzy logic and use of heuristics based on human experience.
MCA-E206-CO-3	To understand the basic concept of fuzzy sets, fuzzy logic & defuzzification.
MCA-E206-CO-4	To provide the mathematical background for carrying out the optimization associated with neural network learning.
MCA-E206-CO-5	Analyze the different types of Hybrid system and understand their practical applications.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Compiler Design

Course Code (CC): MCA-E207

MCA-E207-CO-1	Understand the concepts of compiler design, its compilation phases of programming language and learn to implement Lex, YAAC tools for small problems.
MCA-E207-CO-2	Analyze the various parsing techniques and solve ambiguity problems by using parse trees and context free grammar.
MCA-E207-CO-3	Apply various intermediate forms to generate intermediate codegeneration
MCA-E207-CO-4	Implements various data structures schemes for memory management and analyzes the detection and recovery of error.
MCA-E207-CO-5	Apply code optimization techniques for effective data flow, Have a good knowledge of formal computation and its relationship to languages.

Semester- II

Course Name: Career Skills-II

Course Code (CC): MCA-A208

MCA-A208-CO-1	Solve campus placements aptitude papers covering Logical Reasoning and quantitative aptitude
MCA-A208-CO-2	Formulate the problem quantitatively and use appropriate arithmetical, and/or statistical methods to solve the problem
MCA-A208-CO-3	Interpret quantitative information (i.e., formulas, graphs, tables, models, and schematics) and draw implications from them.
MCA-A208-CO-4	Thinking critically and applying basic mathematics skills to interpret data, draw conclusions, and solve problems and developing proficiency in numerical reasoning.
MCA-A208-CO-5	Enhance Lateral thinking and thus helps in passing in competitive exams.

Semester- II

Course Name: Soft Skills-II

Course Code (CC): MCA-A209

MCA-A209-CO-1	Make use of techniques of Grammar and Vocabulary.
MCA-A209-CO-2	Apply the conceptual understanding of communication into everyday practice.
MCA-A209-CO-3	Understand the importance of teamwork and Oral Communication.
MCA-A209-CO-4	Develop written communication.
MCA-A209-CO-5	Apply business etiquette skills effectively a professional requires.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Responsive Web Applications Lab

Course Code (CC): MCA-C251

MCA-C251-CO-1	Implement the understood concepts of HTML & CSS to design the layout of HTML document and design static web pages.
MCA-C251-CO-2	Enhance the responsiveness of web site with the integration of Bootstrap Components and Flex.
MCA-C251-CO-3	Learn and demonstrate the basic concepts of client side scripting and various validations constructs using JavaScript, AJAX.
MCA-C251-CO-4	Learn and demonstrate the fundamental concepts of server side scripting and basic programming concepts using PHP.
MCA-C251-CO-5	Develop technical knowledge of database connectivity and validation of web application through MySQL, PHP and JavaScript so that student can meet the current industry, Academic and research requirement.

Semester- II

Course Name: Functional Programming Using Python Lab

Course Code (CC): MCA-C252

MCA-C252-CO-1	Understand the working of Python IDE and develop small applications in python.
MCA-C252-CO-2	Ability to implement various data structure in python to solve real world problems.
MCA-C252-CO-3	Implement the solutions of real world problems using numpy.
MCA-C252-CO-4	Develop Object Oriented supported applications and use various inbuilt libraries and perform file handling to solve real world problems.
MCA-C252-CO-5	Develop Rich and real world problem solving applications to use flask and django, Academic and research requirement.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- II

Course Name: Data Communication and Computer Networks Lab

Course Code (CC): MCA-C253

MCA-C253-CO-1	Understand fundamental underlying principles of computer networking.
MCA-C253-CO-2	Identify and Construct digital data communication on simulation software.
MCA-C253-CO-3	Demonstrate basic digital data communication techniques and illustrate the OSI layers, functions and its protocols.
MCA-C253-CO-4	Define the data communication and computer network problem, identify alternative solutions and successfully execute the plan
MCA-C253-CO-5	Rephrase the acquired technical communication skills in the form of documentation of the carried out lab work.

Semester- II

Course Name: Mini Project-II

Course Code (CC): MCA-S254

MCA-S254-CO-1	Conceptualize, design and implement solutions for specific problems.
MCA-S254-CO-2	Communicate the solution through presentations and technical reports.
MCA-S254-CO-3	Apply resource management skills for projects.
MCA-S254-CO-4	Synthesis self learning, team work and ethics.
MCA-S254-CO-5	Produce entrepreneurs who can develop customized solutions for small to large Enterprises.

Semester- II

Course Name: Technical Skills-I

Course Code (CC): MCA-S255

MCA-S255-CO-1	Understand and illustrate the technical concepts of C and C++ programming language
MCA-S255-CO-2	Develop the technical skills in the students.
MCA-S255-CO-3	Enhance and improve the employability of students.
MCA-S255-CO-4	Develop the lifelong learning skills.
MCA-S255-CO-5	Enhance the problem solving abilities and skills of the students.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Application Development Using .Net Technology Framework

Course Code (CC): MCA-C301

MCA-C301-CO-1

Understand the basic concept of programming. To develop problem analysis and problem solving skills for real time problem using .NET framework technology.

MCA-C301-CO-2

Identify and analyze the existing problems in real time environment and develop the new solution using the programming concept using .net framework technology.

MCA-C301-CO-3

Develop critical thinking, analytical skills to develop new window and web application for existing problems using .net framework technology.

MCA-C301-CO-4

Implement validation controls on web based application using ASP.NET validation, standard and rich controls.

MCA-C301-CO-5

Develop technical knowledge of ADO.net, Asp.net and window programming so that student can meet the current industry, academic and research requirement.

Semester- III

Course Name: Artificial Intelligence

Course Code (CC): MCA-C302

MCA-C302-CO-1

Understand the basics of the theory and practice of Artificial Intelligence as a discipline.

MCA-C302-CO-2

Outline and choose appropriate idealizations for converting real world problems into AI search problems formulated using the appropriate search Algorithm.

MCA-C302-CO-3

Interpret functions and strategies for game playing and implementing different search problems based on time and space complexities for standard search algorithms.

MCA-C302-CO-4

Apply knowledge representation techniques for problem solving and analyze various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

MCA-C302-CO-5

Combine self-learning and research skills to be able to tackle a topic of interest on his/her own or as part of a team.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Advance Java Script

Course Code (CC): MCA-E303

MCA-E303-CO-1	Identify the latest trends in web development technologies are being used to solve real world problems
MCA-E303-CO-2	Understand the integration of various web technologies like AJAX, JQuery and JSON to develop problem solving web applications and sites
MCA-E303-CO-3	Understand the object oriented programming in PHP and able to implement OOP concepts in web projects
MCA-E303-CO-4	Able to work with session management techniques in PHP and enhance security the of web applications
MCA-E303-CO-5	Solve complex business problem by developing application on web frameworks like codeigniter.

Semester- III

Course Name: Advance Java

Course Code (CC): MCA-E304

MCA-E304-CO-1	Understand the concepts of Advance Java for rapid web application development using JSP
MCA-E304-CO-2	Understand the concept of Java Server Faces Framework to design real time web application
MCA-E304-CO-3	Understand the concept of Hibernate to implement Modern database supported application using Hibernate
MCA-E304-CO-4	Understand the concept of Spring Framework to develop the Software as per current industry requirement
MCA-E304-CO-5	Understand the concept of Spring Boot Framework to develop the Software as per current industry requirement

Semester- III

Course Name: Big Data

Course Code (CC): MCA-E305

MCA-E305-CO-1	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
MCA-E305-CO-2	Learn how to navigate the Hadoop ecosystem and understand how to optimize its use.
MCA-E305-CO-3	Able to access and process data on Distributed File System.
MCA-E305-CO-4	Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data.
MCA-E305-CO-5	Apply the knowledge of Hive, PIG, YARN, Sqoop, Flume and HBase in different IT solutions.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Cloud Application Development

Course Code (CC): MCA-E306

MCA-E306-CO-1	Design, Develop & Deploy real-world applications in the cloud computing platforms they have learnt.
MCA-E306-CO-2	Demonstrate ability to access various common cloud services.
MCA-E306-CO-3	Describe the standardization process of cloud platform and various API's.
MCA-E306-CO-4	Describe the methods for managing the data in the cloud and demonstrate the concepts of automation, provisioning using puppet tools.
MCA-E306-CO-5	Analyze the significance of virtualization in Cloud Computing.

Semester- III

Course Name: Internet of Things

Course Code (CC): MCA-E307

MCA-E307-CO-1	Understand the vision of Internet of Things from a global context.
MCA-E307-CO-2	Building state of the art architecture in IoT, application of IoT in real world design constraints.
MCA-E307-CO-3	Understand the relevance of IoT in Indian Scenario and challenges in IoT security and implementation.
MCA-E307-CO-4	Comprehend physical and logical design of IoT, IoT privacy and security governance and resource management in IoT.
MCA-E307-CO-5	Able to provide an insight on the IoT system management, IoT design methodology, IoT tools and physical devices.

Semester- III

Course Name: Digital Image Processing

Course Code (CC): MCA-E308

MCA-E308-CO-1	Understand, design and implement solutions for digital image processing problems.
MCA-E308-CO-2	Understand the 2D and 3D Geometric Primitives and apply Mathematical Transforms on various images.
MCA-E308-CO-3	Apply image enhancement techniques in spatial and frequency domain.
MCA-E308-CO-4	Analyzing the mathematical modelling of image restoration and compression.
MCA-E308-CO-5	Apply the basic concept, strengths and limitations of DIP applications in solving problems with both professional peers and lay clients.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Cyber Security

Course Code (CC): MCA-E309

MCA-E309-CO-1	Understand the concept of cyber security and its vulnerabilities.
MCA-E309-CO-2	Comprehend the cyber security safeguards.
MCA-E309-CO-3	Understand and demonstrate web security concepts.
MCA-E309-CO-4	Understand and demonstrate network security concepts.
MCA-E309-CO-5	Comprehend and illustrate the concepts of cryptographic algorithms.

Semester- III

Course Name: Organizational System and Management

Course Code (CC): MCA-G310

MCA-G310-CO-1	Understand the meaning of management, organization and organization culture.
MCA-G310-CO-2	Analyse the roles and responsibilities of different people at hierarchy.
MCA-G310-CO-3	Understand the role of staffing and controlling in an organizational system
MCA-G310-CO-4	Understand various processes involved in different functional areas
MCA-G310-CO-5	Understand and analyse the role of Information systems in a business and provide IT Solutions to it.

Semester- III

Course Name: Business Case Studies

Course Code (CC): MCA-G311

MCA-G311-CO-1	Understand working of Inventory Control System.
MCA-G311-CO-2	Understand working of Payroll Management System.
MCA-G311-CO-3	Understand working of Insurance Sector.
MCA-G311-CO-4	Understand Banking Operations.
MCA-G311-CO-5	Understand Market Management, Supply Chain Management, Logistics, and Advertising.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Application Development Using .Net Technology Framework Lab

Course Code (CC): MCA-C351

MCA-C351-CO-1	Understand the working of visual studio IDE with the fundamentals concepts of programming using C# .NET.
MCA-C351-CO-2	Develop the fundamentals of Object oriented programming to create console application using C#.net.
MCA-C351-CO-3	Analysis the critical problems of the real time environment and able to design new windows application using windows programming constructs through c#.net.
MCA-C351-CO-4	Learn to create web application and implement validation controls on web-based application using ASP.NET validation, standard and rich controls.
MCA-C351-CO-5	Develop technical knowledge of ADO.net, Asp.net and window programming so that student can meet the current industry, academic and research requirement.

Semester- III

Course Name: Advance Java Script Lab

Course Code (CC): MCA-E352

MCA-E352-CO-1	Implement the understood concepts of HTML & CSS to design the layout of HTML document and design static web pages.
MCA-E352-CO-2	Enhance the responsiveness of web site with the integration of Bootstrap Components and Flex.
MCA-E352-CO-3	Learn and demonstrate the basic concepts of client side scripting and various validations constructs using JavaScript, AJAX.
MCA-E352-CO-4	Learn and demonstrate the fundamental concepts of server side scripting and basic programming concepts using PHP.
MCA-E352-CO-5	Develop technical knowledge of database connectivity and validation of web application through MySQL, PHP and JavaScript so that student can meet The current industry, academic and research requirement.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- III

Course Name: Advance Java Lab

Course Code (CC): MCA-E353

MCA-E353-CO-1	Design and Develop Web applications with database connectivity using Java Server Pages
MCA-E353-CO-2	Design and Develop Web application to fulfill current industry requirement using Java /Server Faces and Maven
MCA-E353-CO-3	Implements advanced database enabled Web applications using Hibernate as per current industry requirement.
MCA-E353-CO-4	Develop the solutions of real time problems using Spring Framework.
MCA-E353-CO-5	Develop dynamic web applications using Spring Boot to solve real time industry problems.

Semester- III

Course Name: Big Data Lab

Course Code (CC): MCA-E354

MCA-E354-CO-1	Understand and apply the Perform setting up and Installing Hadoop in its three operating modes
MCA-E354-CO-2	Implementing the basic commands of LINUX Operating System and the file Management tasks in Hadoop.
MCA-E354-CO-3	Understand Map Reduce Paradigm by applying Map Reduce program that mines weather data, matrix multiplication with Hadoop MapReduce.
MCA-E354-CO-4	Understand the installation of PIG, Pig Latin scripts sort, group, join, project, and filter your data.
MCA-E354-CO-5	Understand the installation of HIVE and able to apply Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Semester- III

Course Name: Cloud Application Development Lab



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Course Code (CC): MCA-E355

MCA-E355-CO-1	Design, Develop & Deploy real-world applications in the cloud computing platforms they have learnt.
MCA-E355-CO-2	Demonstrate the ability to access the various cloud platforms used.
MCA-E355-CO-3	Develop an application by using various API's.
MCA-E355-CO-4	Demonstrate and implement the concepts of automation, provisioning using puppet tool.
MCA-E355-CO-5	Design Applications using different web app frameworks.

Semester- III

Course Name: Mini Project-III

Course Code (CC): MCA-S356

MCA-S356-CO-1	Define the problems in various domains that can be solved using computer applications.
MCA-S356-CO-2	Develop the ability to identify alternative solutions and plan the project.
MCA-S356-CO-3	Analyze and Design the software development process.
MCA-S356-CO-4	To develop coding and testing skills for software development
MCA-S356-CO-5	Build technical presentation skills and Create project documentation of the complete process.

Semester- III

Course Name: Summer Internship Report Viva-Voce

Course Code (CC): MCA-S357

MCA-S357-CO-1	Prepare graduates who can communicate effectively.
MCA-S357-CO-2	Prepare graduates to be productive contributors in professional practice and some other career path.
MCA-S357-CO-3	Prepare graduates with a broad knowledge of industry.
MCA-S357-CO-4	Prepare graduates with key knowledge and skills in applied software design, analysis.
MCA-S357-CO-5	Students gain more experience in accomplishing a long-term project, and managing and completing the projects in the industry.

Semester- III



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Course Name: Technical Skills-II

Course Code (CC): MCA-S358

MCA-S358-CO-1	Understand and illustrate the technical concepts of C,C++, data structures, DBMS, and TOC and compiler design.
MCA-S358-CO-2	Develop and enhance competitive and problem solving skills in the students.
MCA-S358-CO-3	Enhance and improve the understanding of recent trends to have more opportunities of employability.
MCA-S358-CO-4	Develop the lifelong learning skills as per the industry needs.
MCA-S358-CO-5	Enhance the problem solving abilities and skills of the students.

Semester- III

Course Name: Research Paper Presentation

Course Code (CC): MCA-S359

MCA-S359-CO-1	Develop a protocol for a literature review of a research topic.
MCA-S359-CO-2	Discuss the implications of the report.
MCA-S359-CO-3	Demonstrate competent verbal and written skills.
MCA-S359-CO-4	Comprehensively search the literature using appropriate keywords and databases.
MCA-S359-CO-5	Critically appraise literature relevant to a research topic or question.



UTTARANCHAL UNIVERSITY

(Established vide Uttaranchal University Act, 2012)

(Uttarakhand Act No. 11 of 2013)

Arcadia Grant, P.O. Chandanwari, Premnagar, Dehradun, Uttarakhand

Semester- IV

Course Name: Industrial Training

Course Code (CC): MCA-C401

MCA-C401-CO-1	Enhance the presentation and communication skills of an individual by project presentation to face a prospective technical interview and able to Create technical Documentation of the required project.
MCA-C401-CO-2	Identify, formulate, and solve various project planning strategies, including the Pert chart, Gantt chart, specification, design and implementation of software systems that meet performance, maintenance and quality requirements.
MCA-C401-CO-3	Enhance project-based learning skills, such as to define the problem, identify alternative solutions, plan the project, execute the plan, monitor and control the project progress for successful designing.
MCA-C401-CO-4	Develop the critical analysis skills and able to apply various testing tools like Unit testing, System testing, Black Box testing, Alpha testing and Beta testing techniques on the project.
MCA-C401-CO-5	Become employable/entrepreneurs who can analyze the problem and develop customized solution using programming language for small to large Enterprises.