PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES

PG DEPARTMENT OF COMPUTER SCIENCE

B.Sc (COMPUTER SCIENCE) - SKILL-BASED COURSES, NON-MAJOR ELECTIVE COURSES, EXTRA-CREDIT COURSES & VALUE-ADDED COURSES

PSO, PO & CO STATEMENTS / 2019

PSOs	**PROGRAMME SPECIFIC OUTCOMES**
PSO1	Able to work in the areas of programming, database, multimedia, web designing, networking and to acquire knowledge in various domain based electives.
PSO2	Accomplish the ability to design and develop computer applications for real world problems.
PSO3	Able to create platforms to become an entrepreneur and a relish for higher studies such as M.C.A., M.Sc., etc.,
PSO4	Apply standard Computer science practices and strategies in real-time software project development.
PSO5	An ability to apply mathematical methodologies to solve computation task, model, real world problem using appropriate data structure and suitable algorithm.
B.Sc (COMPUTER SCIENCE)	
B.Sc (COMPUTER SCIENCE) / PROGRAMMES OUTCOMES	
POs	**Description of POs**
PO1	Ability to apply knowledge of computing and mathematics to solve problems.
PO2	Able to survive in today's interconnected world with the knowledge earned through critical thinking and fundamental core concepts.

PO3	Become women entrepreneur such as web designer, database developer, programmer and multimedia designer.
PO4	Providing hands-on –training in state- of- the art technologies to design and implement software applications for social, economic, health , safety and ethical issues.
PO5	Have sufficient knowledge in hardware and software to meet the current industry requirements.

B.Sc (COMPUTER SCIENCE)/ COURSE OUTCOMES		
	Description of COs	**Bloom's Taxonomy / Cognitive Domain**
MUCSC1 / Core-I	**FUNDAMENTALS OF DIGITAL COMPUTERS**	
CO1.	Gain knowledge of input and output devices, Number systems, simplification techniques, combinational and sequential circuits.	Knowledge (Level K1)
CO2.	Understand the fundamental concepts and techniques used in digital electronics.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply the concepts of Boolean Algebra, Logic gates, Logic variables and Truth tables to simplify equations.	Application (Level K3)
CO4.	Comprehend the combinational logic in terms of Adder, Subtractor and Multiplexer circuits.	Comprehend (Level K3)
CO5.	Analyze combinational logic in terms of Adder, Subtractor and Multiplexer circuits.	Analysis (Level K4)
MUCSL1 / Core-II	**WEB DESIGNING AND MULTIMEDIA LAB**	
CO1.	To know the basic concepts of Photoshop.	Knowledge (Level K1)
CO2.	Design visiting cards, invitations, greeting cards using Photoshop.	Applications (Level K3)
CO3.	Implement various concepts using Photoshop.	Comprehension(Level K2)
CO4.	Create animation using Macromedia flash.	Synthesis(Level K5)

CO5.	Create website by using HTML tags.	Synthesis(Level K5)
MUCSA1 / Allied-I	**MATHEMATICS I -DISCRETE MATHEMATICS**	
CO1.	Recall the basic concepts of Mathematics.	Knowledge (Level K1)
CO2.	Impart different kinds of Matrices, Equations, Sets, Relations and Graphs.	Knowledge (Level K1)
CO3.	Comprehend different kinds of Matrices, Equations, Sets, Relations and Graphs.	Comprehension (Level K2)
CO4.	Solve the equations to find the roots.	Comprehension (Level K2) Application (Level K3)
CO5.	Analyze the real world problems using Graph Theory.	Analysis (Level K4)
MUCSOA1 / SBC- I	**OFFICE AUTOMATION LAB**	
CO1.	Understand the dynamics of an office environment.	Comprehension (Level K2)
CO2.	Use various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Comprehension (Level K2)
CO3.	Design various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO4.	The ability to apply application software in an office environment.	Application (Level K3)
CO5.	The ability to implement applications in an office environment.	Comprehension(Level K2)
MUCSC2 / Core - III	**PROGRAMMING IN 'C'**	
CO1.	Recall and understand the fundamentals of C programming. To acquire the programming logic, use of program instruction, syntax and programming structure.	Knowledge (Level K1)
CO2.	To acquire the programming logic, use of program instruction, syntax and programming structure.	Comprehension (Level K2)
CO3.	Understand the concepts of decision making, branching and looping.	Knowledge (Level K1) Comprehension(Level K2)
CO4.	Implement different operations on arrays and functions to solve the problem.	Application (Level K3)

CO5.	Execute file operations to preserve data in physical disk.	Application(Level K3)
MUCSL2 / Core -IV	**PROGRAMMING IN 'C' LAB**	
CO1.	Read and understand the execution of programs written in C language.	Knowledge (Level K1)
CO2.	Trace the execution of programs written in C language.	Comprehension (Level K2)
CO3.	Implement various concepts in C.	Application(Level K3)
CO4.	Implement programs with pointers and arrays, perform pointer arithmetic and use the pre-processor.	Application(Level K3)
CO5.	Write the C code for a given algorithm.	Analysis(Level K4) Synthesis (Level K5)
MUCSA2 / Allied-II	**MATHEMATICS II (STATISTICS)**	
CO1.	Revise the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc.	Knowledge (Level K1)
CO2.	Describe the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc.	Comprehension (Level K2)
CO3.	Understand the concepts Central tendency, Dispersion, Correlation and regression, Probability and Sampling theory.	Comprehension (Level K2)
CO4.	Solve the problems by using formulas.	Comprehension(Level K2) Application(Level K3)
CO5.	Apply the suitable techniques of statistics to solve real time problems.	Application(Level K3)
MUCSNA2 / SBC II	**NUMERICAL APTITUDE**	
CO1.	Recollect and describe the basic concepts of logical reasoning.	Knowledge (Level K1) Comprehension (Level K2)

CO2.	Discuss problem solving and reasoning ability.	Comprehension (Level K2)
CO3.	Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Application(Level K3)
CO4.	Apply various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Application(Level K3)
CO5.	Critically evaluate various real life situations by resorting to analysis of key issues and factors.	Analysis (Level K4)
MUCSC3 / Core - V	**OBJECT ORIENTED PROGRAMMING WITH C++**	
CO1.	Get an idea about object oriented paradigm with concepts of streams, classes, functions, data and objects and also recollect the concepts of files.	Knowledge (Level K1)
CO2.	Classify difference between object oriented programming and procedural oriented language and data types in C++.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply dynamic memory management techniques using pointers, constructors, destructors, etc.,	Knowledge (Level K1) Application (Level K3)
CO4.	Validate the use of various OOPs concepts with the help of programs.	Analysis (Level K4) synthesis(Level K5)
CO5.	Acquire the concept of polymorphism and apply inheritance with the understanding of early and late binding.	Application (Level K3) Analysis (Level K4)
MUCSC4 / Core - VI	**COMPUTER ORGANIZATION**	
CO1.	Recollect the basic structure of Computer and get the idea about instructions, input-output organization, Memory system, Processing and Pipelining.	Knowledge (Level K1)
CO2.	Understand the basic structure of Computer and get the idea about instructions, input-output	Comprehension (Level K2)

	organization, Memory system, Processing and Pipelining.	
CO3.	Classify various digital components.	Comprehension (Level K2)
CO4.	Describe arithmetic and logic operations of processing unit.	Comprehension (Level K2) Application (Level K3)
CO5.	Analyze various types of computers, instructions, memory system and working principles of pipelining.	Application (Level K3) Analysis (Level K4)
MUCSC5 / Core - VII	**DATA STRUCTURES**	
CO1.	Recognize fundamental concepts of Data structures, space complexity and time complexity.	Knowledge (Level K1)
CO2.	Understand linear data structures such as stacks, queues, linked list and non linear data structures such as trees and Graphs.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply appropriate data structure for a given application.	Application (Level K3)
CO4.	Implement different searching and sorting techniques.	Application (Level K3)
CO5.	Analyze efficient algorithms by acquiring knowledge about time and space complexities of the algorithms.	Analysis (Level K4) Synthesis(Level K5)
MUCSL3/ Core - VIII	**C++ WITH DATA STRUCTURES LAB**	
CO1.	Understand Object oriented features and C++ concepts.	Comprehension (Level K2)
CO2.	Apply Object oriented features and C++ concepts.	Application (Level K3)
CO3.	Practice to solve the real world problems.	Application (Level K3)
CO4.	Apply to solve the real world problems.	Application (Level K3)
CO5.	Experiment various data structure concepts using C++.	Analysis (Level K4)
MUCSA3 / Allied-III	**MATHEMATICS-III COMPUTER BASED OPTIMIZATION TECHNIQUES**	

CO1.	Recall the concept of Operation Research.	Comprehension (Level K2)
CO2.	Describe the concept of Operation Research.	Comprehension (Level K2)
CO3.	Apply transportation and assignment problem to allocate resources.	Application (Level K3)
CO4.	Acquire the knowledge about game theory.	Analysis (Level K4)
CO5.	Validate network scheduling by PERT and CPM.	Synthesis (Level K5)
MUCSHR3 / SBC III	**HUMAN RIGHTS**	
CO1.	Know the basic rights and freedoms, regardless of their political, economical and cultural systems.	Knowledge (Level K1)
CO2.	Understand the importance and historical growth of the Human Rights.	Knowledge (Level K1)
CO3.	Describe historical growth of the Human Rights.	Comprehension (Level K2)
CO4.	Demonstrate the awareness of international context of human rights.	Comprehension (Level K2) Application (Level K3)
CO5.	Categorize the modern issues regarding child and women.	Analysis (Level K4)
MUCSN1 / NME-I	**Computer Application for Automation**	
CO1.	Design various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO2.	Use various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO3.	Understand the dynamics of an office environment.	Comprehension (Level K2)
CO4.	Apply application software in an office environment.	Application (Level K3)
CO5.	The ability to implement applications in an office environment.	Comprehension(Level K2)
MUCSC6 / Core - IX	**JAVA PROGRAMMING**	
CO1.	Recollect the OOPs concepts such as Class, Inheritance, Encapsulation and Polymorphism.	Knowledge (Level K1) Comprehension (Level K2)

CO2.	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Implement programs using more advanced futures such as Interface, Packages and Multithreading.	Application (Level K3)
CO4.	Analyze differences between application program and applets, applet lifecycle and graphics programming.	Analysis(Level K4)
CO5.	Validate Java Programs using Stream Classes and files.	Synthesis(Level K5)
MUCSC7 / Core - X	**OPERATING SYSTEM**	
CO1.	Recollect the concept of fundamental aspect of operating system.	Knowledge (Level K1)
CO2.	Describe the concept of fundamental aspect of operating system.	Knowledge (Level K1)
CO3.	Understand the concept of scheduling algorithms, Deadlock, process management and memory management.	Knowledge (Level K1) Comprehension (Level K2)
CO4.	Sketch the Threats, Memory management and production policies.	Application (Level K3)
CO5.	Acquire the knowledge about file management.	Analysis(Level K4)
MUCSL4 / Core - XI	**WEB PROGRAMMING LAB**	
CO1.	Discuss the core concepts of web programming such as Java script, JSP, PHP.	Comprehension (Level K2)
CO2.	Understand the core concepts of web programming such as Java script, JSP, PHP.	Comprehension (Level K2)
CO3.	Design interactive web pages using Java script.	Application (Level K3)
CO4.	Apply interactive web pages using Java script.	Application (Level K3)
CO5.	Validate server side scripting using JSP and PHP.	Synthesis(Level K5)
MUCSL5 / Core - XII	**JAVA PROGRAMMING LAB**	
CO1.	Sketch the Oops concepts and gain the knowledge of Java and Applet.	Application (Level K3)

CO2.	Apply the Oops concepts and gain the knowledge of Java and Applet.	Application (Level K3)
CO3.	Describe the core java concepts.	Analysis (Level K4)
CO4.	Implement core java concepts.	Analysis (Level K4)
CO5.	Create simple stand alone application using Core Java and remote applications using Applet.	Synthesis(Level K5)
MUCSAL6 / Allied-IV	**MATHEMATICS IV- R-PROGRAMMING LAB**	
CO1.	Import and summarize data-sets in R.	Knowledge (Level K1)
CO2.	Review and manipulate and summarize data-sets in R.	Comprehension (Level K2)
CO3.	Identify online resources for R and import new function packages into the R workspace.	Comprehension(Level K2)
CO4.	Demonstrate use of basic functions.	Application (Level K3)
CO5.	Create and edit visualizations with R.	Analysis (Level K4) Synthesis(Level K5)
MUCSOS4 / SBC IV	**OPEN SOURCE SOFTWARE**	
CO1.	Recall the concepts of Open Source, Linux, Java Script and PHP.	Knowledge (Level K1)
CO2.	Describe the concepts of Open Source, Linux, Java Script and PHP.	Comprehension (Level K2)
CO3.	Demonstrate the basics of Open Source Software.	Application (Level K3)
CO4.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)
CO5.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)
MUCSC8 / Core - XIII	**RELATIONAL DATABASE MANAGEMENT SYSTEM**	
CO1.	Remember and understand the basic concepts and applications of database system.	Knowledge (Level K1)

		Comprehension (Level K2)
CO2.	Get the idea about various data models which describes the structure of database.	Comprehension (Level K2
CO3.	Design principles using ER models and Normalization approach.	Comprehension (Level K2) Application (Level K3)
CO4.	Apply principles using ER models and Normalization approach.	Application (Level K3)
CO5.	Interpret SQL interface of a RDBMS package to create, secure, maintain and query a database and PL/SQL programming using Triggers and Cursors.	Analysis (Level K4)
MUCSL7 / Core - XIV	**.NET PROGRAMMING LAB**	
CO1.	Understand the database connectivity with application programming.	Analysis (Level K4)
CO2.	Demonstrate the database connectivity with application programming.	Analysis (Level K4)
CO3.	Design and execute different kinds of tasks in real time application.	Analysis (Level K4)
CO4.	Apply different kinds of tasks in real time application.	Analysis (Level K4)
CO5.	Validate the results for the given input data.	Synthesis (Level K5)
MUCSL8 / Core - XV	**RELATIONAL DATABASE MANAGEMENT SYSTEM LAB**	
CO1.	Apply constraints in tables.	Analysis (Level K4)
CO2.	Figure out the need and use of database in application development.	Application (Level K3)
CO3.	Apply the uses of database in application development.	Application (Level K3)
CO4.	Describe the concepts of triggers and cursors.	Synthesis(Level K5)
CO5.	Evaluate the concepts of triggers and cursors.	Synthesis(Level K5)
MUCSE1 / Elective-I	**COMPUTER GRAPHICS AND MULTIMEDIA**	
CO1.	Recollect the basic concept of Graphical techniques.	Knowledge (Level K1)

CO2.	Describe about the basic concept of Graphical techniques.	Knowledge (Level K1)
CO3.	Get the idea about transformations.	Comprehension (Level K2)
CO4.	Implement various Clipping algorithms.	Application (Level K3)
CO5.	Demonstrate Omni various data types of Multimedia.	Analysis(Level K4)
MUCSE1 / Elective-I	**CLOUD COMPUTING**	
CO1.	Define cloud computing and get the idea about cloud architecture	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Understand different cloud services	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Interpret Cloud Services ,security, and architecture	Application (LevelK3)
CO4.	Examine cloud mail services	Application (LevelK3) Analysis(Level K4)
CO5.	Validate cloud services by using various cloud service provides such as, Amazon, Google and Microsoft	Synthesis(Level K5)
MUCSE1 / Elective-I	**PC MAINTENANCE AND TROUBLE SHOOTING**	
CO1.	Keep in mind the peripherals, processors and configuration of the system	Knowledge (Level K1)
CO2.	Get an idea of installation, working principle and maintenance of secondary storage device	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Deploy the different kinds of equipment for diagnose the problem and trouble shoot it	Application (Level K3)
CO4.	Acquire the knowledge on servicing the switches, cables and connectors.	Application (Level K3) Analysis(Level K4)
CO5.	Assembling a new system with standard hardware components.	Synthesis(Level K5)

MUCSE2 / Elective -II	**INFORMATION SECURITY**	
CO1.	Get an idea about information Security basis, Security Investigation, Security Analysis, Security models and Security Physical Design	Knowledge (Level K1)
CO2.	Understand Security Investigation and Security Analysis,	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Analyse Security models.	Application (Level K3) Analysis (Level K4)
CO4.	Figure out the Physical design of the Security	Analysis (Level K4)
CO5.	Evaluate the Security and Analysis process.	Synthesis(Level K5)
MUCSE2 / Elective -II	**BIG DATA ANALYTICS**	
CO1.	Understand the of big concepts of Big data techniques, environment and Hadoop Ecosystem	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Apply statistical data analysis and tools to manage and analyze the bid data	Comprehension (Level K2) Application (Level K3)
CO3.	Analyze Hadoop components and their uses for big data processing	Application (Level K3) Analysis (Level K4)
CO4.	Examine the impact of big data for business decisions and strategy	Analysis (Level K4)
CO5.	Manage large-scale analytics tools to solve some open big data problems	Synthesis(Level K5)
MUCSE2 / Elective -II	**PRINCIPLES OF COMPILER DESIGN**	
CO1.	Examine the basic function of compiler and interpreter	Comprehension (Level K2)
CO2.	Understand the core concepts of phases of compiler	Comprehension (Level K2)

CO3.	Apply Context Free Grammar for simplify the expression using different kinds of parsers	Application (Level K3)
CO4.	Interpret the code generation and optimization process	Analysis (Level K4) Synthesis(Level K5)
CO5.	Design a simple code generator.	Analysis (Level K4)
MUCSAC5 / SBC V	**ADVANCED COMPUTING TECHNOLOGY**	
CO1.	Describe the nature and its applications of Grid, Cloud, Green, Soft computing.	Knowledge (Level K1)
CO2.	Discuss the nature and its applications of Grid, Cloud, Green, Soft computing.	Comprehension (Level K2)
CO3.	Illustrates the basis of fuzzy logic, fuzzy relations and defuzzification techniques.	Application (Level K3)
CO4.	Apply the basis of fuzzy logic, fuzzy relations and defuzzification techniques.	Application (Level K3)
CO5.	Acquire knowledge about architecture of Grid and Cloud Computing	Analysis (Level K4)
MUCSC9 / Core - XVI	**COMPUTER NETWORKS**	
CO1.	Recall the networking concepts, Transmission media and OSI layers of Network.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Compare OSI & TCP/IP models.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Deploy the elementary Data link protocols.	Application (Level K3)
CO4.	Interpret various Routing algorithms.	Application (Level K3) Analysis (Level K4)
CO5.	Review transport service and Transmission control protocol like DNS, E-mail.	Synthesis(Level K5)
MUCSC10 / Core - XVII	**SOFTWARE ENGINEERING**	
CO1.	Recollect the basic terminologies and requirement for software development.	Knowledge (Level K1)

CO2.	Comprehend the core concepts of life cycle models.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Figure out the Data flow Diagram.	Application(Level K3)
CO4.	Apply the cost & size estimation Techniques and maintenance cost.	Comprehension (Level K2) Analysis (Level K4)
CO5.	Evaluate the software through various testing methods.	Synthesis (Level K5)
MUCSPR / Core - XVIII	**PROJECT WORK**	
CO1.	Understand the problem.	Comprehension (Level K2)
CO2.	Implement & execute the real time application.	Application(Level K3)
CO3.	Apply& execute the real time application.	Application(Level K3)
CO4.	Analyze various testing methods.	Analysis (Level K4)
CO5.	Verify the expected results in real time applications.	Synthesis (Level K5)
MUCSE3 / Elective-III	**DIGITAL IMAGE PROCESSING**	
CO1.	Recollect the various types of data in Multimedia.	Knowledge (Level K1)
CO2.	Understand the fundamental elements of DIP and representation of an image in multi-dimensional aspects.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply arithmetic and logical operations for image enhancement process.	Application (Level K3)
CO4.	Interpret the knowledge on compression techniques for security of an image.	Analysis (Level K4)
CO5.	Verify various deduction mechanisms in image segmentation.	Synthesis(Level K5)
MUCSE3 / Elective-III	**BUSINESS INTELLIGENCE**	
CO1.	Recollect Knowledge Management ,KM System Life Cycle, Knowledge creation, Changing Business	Knowledge (Level K1)

	Environments and Implementing BI	
CO2.	Understand the basic concepts of Knowledge Management	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Acquire knowledge on KM System Life Cycle and, Changing Business Environments	Comprehension (Level K2) Application (Level K3)
CO4.	Define development of a model, representation of input data, data mining process, analysis, methodologies, data validation ,data transformation, data reduction.	Analysis (Level K4)
CO5.	Implement relational marketing, sales force management optimization models for logistics planning, efficiency measures, efficient frontier, the CCR Model	Synthesis(Level K5)
MUCSE3 / Elective-III	**MOBILE COMPUTING**	
CO1.	Gain and understand the concepts of communication medium and multiplexing in telephone network	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Comprehend the routing mechanism and frequency allocation in GSM	Comprehension (Level K2)
CO3.	Deploy the GPRS concepts for packet data transfer in mobile by using GPRS	Analysis (Level K4) Synthesis(Level K5)
CO4.	Acquire the knowledge of WAP,CDMA,3G network and spectrum technologies in wireless network.	Comprehension (Level K2) Application (Level K3)
CO5.	Acquire the knowledge on social media integration.	Synthesis(Level K5)
MUCSSS6 / SBC VI	**SOFT SKILLS**	
CO1.	Describe the reading, writing, listening and communication skills.	Knowledge (Level K1)
CO2.	Discuss the reading, writing, listening and communication skills.	Comprehension (Level K2)

CO3.	Dramatize the day today activities with the help of soft skills.	Application (Level K3)
CO4.	Acquiring the necessary employability skills	Application (Level K3)
CO5.	Analyze and improve the skills for employability.	Analysis (Level K4)
MUCSN2 / NME II	**COMPUTER FOR DIGITAL ERA**	
CO1.	Describe about computer and apply the computing technology in their day to day life.	Knowledge (Level K1)
CO2.	Get an idea about computer and apply the computing technology in their day to day life.	Application (Level K3)
CO3.	To Know digital India initiatives to their surroundings.	Application (Level K3)
CO4.	Create awareness regarding digital India initiatives to their surroundings.	Application (Level K3)
CO5.	Apply digital India initiatives to their surroundings.	Application (Level K3)
EXTRA - CREDIT PAPERS		
Semester-I / UGEGC	**INTERNET OF THINGS**	
CO1.	Gain and understand the concepts of Internet of Things	Knowledge(Level K1)
CO2.	Analyze basic protocols in wireless sensor network	Knowledge(Level K1)
CO3.	Understand the application areas of IOT.	Comprehension (Level K2)
CO4.	Implement interfacing of various network & communication aspects	Analysis(Level K4)
CO5.	Evaluate the various state of the art methodologies	Synthesis(Level K5)
Semester –III / UGET	**TALLY LAB**	
CO1.	Get idea about creation and alteration of company profile	Knowledge (Level K1)
CO2.	Understand and apply various accounting voucher entries	Application (Level K3) Knowledge (Level K1)
CO3.	Acquire the knowledge in bank reconciliation statement preparation and stock summary.	Comprehension (Level K2)

CO4.	Designed to impart knowledge regarding concepts of Financial Accounting.	Application (Level K3)
CO5.	Required skills and can also be employed as Tally data entry operator.	Analysis (Level K4)
Semester –V / UGEMOC	**MOOC ONLINE COURSE**	
CO1.	Understand and use the web services available in Internet	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Know the web resources in Internet.	Analysis (Level K4)
CO3.	Interpret usage of Online courses.	Synthesis (Level K5)
CO4.	Know the available course content of the new technologies.	Analysis (Level K4)
CO5.	Get an idea of New technologies.	Application(Level K3)
VALUE ADDED COURSES		
Semester –II / MUCSHT	**HARDWARE AND TROUBLESHOOTING**	
CO1.	Obtaining knowledge of troubleshoot the hardware components of a computer.	Knowledge (Level K1)
CO2.	Comprehending the troubleshooting techniques for storage devices, input and output devices.	Comprehension (Level K2)
CO3.	Applying the troubleshooting techniques for hardware failures.	Application (Level K3)
CO4.	Examining the troubleshooting techniques in Network, Printers and Mother board.	Analysis (Level K4)
CO5.	Assembling a new system with standard hardware component	Synthesis (Level K5)
Semester –IV / MUCSADPL	**APPLICATION DEVELOPMENT IN PROGRAMMING LANGUAGES**	
CO1.	Acquiring the knowledge of Application Development in Programming Languages	Knowledge (Level K1)
CO2.	Understanding the concept of interpreter and Compiler	Comprehension (Level K2)
CO3.	Illustrating categories of programming languages	Application (Level K3)
CO4.	Correlating various programming languages used in popular website	Analysis (Level K4)

CO5.	Developing simple applications in structured and object oriented Programming Languages.	Synthesis (Level K5)
Semester –VI / MUCSICT	**ICT TOOLS AND TECHNOLOGIES LAB**	
CO1.	Acquiring knowledge about video making and editing techniques	Knowledge (Level K1)
CO2.	Applying different ICT tools for entrepreneurship development	Application (Level K3)
CO3.	Enhancing the digital skill-set required in workplace	Synthesis (Level K5)
CO4.	Appreciation of Technology in everyday life	Analysis (Level K4)
CO5.	Helps them to adjust to the inevitable future changes	Evaluation (Level K6)

PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES

PG DEPARTMENT OF COMPUTER SCIENCE

M.Sc (COMPUTER SCIENCE) – COURSE

PSO, PO AND CO STATEMENTS – 2019-2022

M.Sc (COMPUTER SCIENCE)	
M.Sc (COMPUTER SCIENCE)/ PROGRAMMES SPECIFIC OUTCOMES	
PSOs	**PROGRAMME SPECIFIC OUTCOMES**
PSO1	Apply standard Computer science practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success.
PSO2	Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, Grid and cloud computing.
PSO3	Able to pursue research in Data mining, Image processing and Networking areas and implement his work in MATAB and .Net environment.
PSO4	Ability to develop, design, implement computer programs and use knowledge in various domains to identify research gaps and hence to provide solutions to new ideas and innovations.
PSO5	Apply the acquired knowledge to develop software and innovative solutions by adopting emerging technologies.
M.Sc (COMPUTER SCIENCE)	
M.Sc (COMPUTER SCIENCE)/ PROGRAMMES OUTCOMES	
POs	**Description of POs**

PO1	Communicate computer science concepts, designs, and solutions effectively and professionally.
PO2	Apply knowledge of computing to produce effective designs and solutions for specific problems.
PO3	Identify, analyze, and synthesize scholarly literature relating to the field of computer science.
PO4	Use software development tools, software systems, and modern computing platforms.
PO5	Attend SET/NET exams with confidence

M.Sc (COMPUTER SCIENCE)/ COURSE OUTCOMES		
	Description of COs	**Bloom's Taxonomy / Cognitive Domain**
MPCSC1 / Core-I	**Mathematical Foundation of Computer Science**	
CO1.	Recognize mathematical logics to solve computational problems.	Comprehension (Level K2)
CO2.	Examine the concepts of sets, relations and functions.	Application(Level K3)
CO3.	Formulate problems and solve recurrence relations.	Application(Level K3) Analysis (Level K4)
CO4.	Develop solutions for real world problems using graph theory.	Synthesis (Level K5)
CO5.	Evaluate the real world problems using graph theory.	Evaluation (Level K6)
MPCSC2 / Core-II	**Advanced java Programming**	
CO1.	Understand the logics of applets, AWT event handling, Servlet and RMI.	Comprehension (Level K2)
CO2.	Write Servlets to access database using Java Data Base Connectivity (JDBC).	Application(Level K3)
CO3.	Applications of database using Java Data Base Connectivity (JDBC).	Application(Level K3)
CO4.	Demonstrate capabilities of server using the concept of Servlet.	Analysis(Level K4)

CO5.	Validate remote methods in an application using Remote Method Invocation (RMI.)	Synthesis(Level K5)
MPCSC3 / Core-III	**Advanced Operating System**	
CO1.	Understand the concepts of distributed operating system.	Comprehension (Level K2)
CO2.	Describe the concepts of distributed operating system.	Comprehension (Level K2)
CO3.	Apply the concepts of synchronization and handle Deadlocks.	Application(Level K3)
CO4.	Examine the functionalities of distributed resource management.	Analysis(Level K4)
CO5.	Evaluate various operating systems such as multiprocessor operating system and database operating system.	Synthesis(Level K5)
MPCSL1 / Core-IV	**Advanced Java Programming Lab**	
CO1.	Execute interactive web pages using HTML and JavaScript.	Application(Level K3)
CO2.	Apply interactive web pages using HTML and JavaScript.	Application(Level K3)
CO3.	Acquire knowledge about Servlet and RMI.	Analysis(Level K4)
CO4.	To connect java program with external database using JDBC.	Synthesis(Level K5)
CO5.	Evaluate with external database using JDBC.	Synthesis(Level K5)
MPCSL2 / Core-V	**Web Technology Lab**	
CO1.	Create web pages using HTML and CSS.	Application(Level K3)
CO2.	Describe web pages using HTML and CSS.	Application(Level K3)
CO3.	Apply JavaScript for interactive web pages.	Application(Level K3)
CO4.	Validate server side scripting using JSP.	Synthesis(Level K5)
CO5.	Evaluate server side scripting using JSP.	Synthesis(Level K5)
MPCSE1 / Elective-I	**Design and Analysis of Algorithm**	

CO1.	Get the idea of working principles of different algorithms.	Comprehension (Level K2)
CO2.	Understand the concept of various searching and sorting algorithms.	Application(Level K3)
CO3.	Apply the concept of various searching and sorting algorithms.	Application(Level K3)
CO4.	Analyze various design and analysis techniques such as greedy algorithms, dynamic programming, back tracking and branch & bound.	Analysis(Level K4)
CO5.	Evaluate time complexity using Asymptotic Notation.	Synthesis(Level K5)
MPCSE1 / Elective-I	**Embedded Systems**	
CO1.	Understand the basic concepts of embedded system	Comprehension (Level K2)
CO2.	Interpret the working concept of the processor and memory organization of embedded system	Application(Level K3)
CO3.	Examine the real time and embedded system operating systems	Analysis(Level K4)
CO4.	Evaluate various programming environment used to develop embedded systems	Synthesis(Level K5) Evaluation (Level K6)
CO5.	Acquire knowledge about life cycle of embedded design and its testing	Synthesis(Level K5)
MPCSE1 / Elective-I	**Artificial Intelligence and Machine Learning**	
CO1.	Understand the basic concepts of Artificial Intelligence and machine learning algorithms	Comprehension (Level K2)
CO2.	Classify strength and weakness of different problem solving techniques	Comprehension (Level K2)
CO3.	Apply Artificial Intelligence and Machine Learning Techniques to solve real world problems	Application(Level K3) Analysis(Level K4)
CO4.	Examine the different heuristic techniques for problem solving and create new solutions	Synthesis(Level K5)
CO5.	Apply selected basic AI techniques	Application(Level K3)
MPCSC4 / Core-VI	**Cryptography and Network Security**	

CO1.	Describe cryptography and network security concepts and its application.	Comprehension (Level K2)
CO2.	Get the idea about encryption standards.	Comprehension (Level K2)
CO3.	Examine various cryptography algorithms.	Application(Level K3)
CO4.	Validate the authentication using digital signature and authentication protocols.	Synthesis(Level K5)
CO5.	Evaluate the authentication using digital signature and authentication protocols.	Synthesis(Level K5)
MPCSC5 / Core-VII	**Data Mining**	
CO1.	Understand the basic Concepts of data mining and data warehousing.	Comprehension (Level K2)
CO2.	Analyze various data mining techniques like classifications, clustering, association rule mining, prediction and related algorithm.	Analysis(Level K4)
CO3.	Choose appropriate data mining techniques to carry out simple data mining tasks.	Application(Level K3)
CO4.	Analyse data mining techniques to carry out simple data mining tasks.	Analysis(Level K4)
CO5.	Develop data mining algorithms to store heterogeneous data.	Synthesis(Level K5)
MPCSC6 / Core-VIII	**Python Programming**	
CO1.	Get the basic knowledge about Python Programming.	Comprehension (Level K2)
CO2.	Apply essential programming concepts like strings, operators, conditional statements, functions, files and exception handling of Python in simple programs.	Application(Level K3)
CO3.	Analyze various concepts of Python.	Analysis (Level K4)
CO4.	Create applications using core concepts of Python.	Synthesis (Level K5)
CO5.	Evaluate applications using core concepts of Python.	Evaluation (Level K6)
MPCSL3 / Core-IX	**Python Programming Lab**	
CO1.	Implement various operators of Python.	Application(Level K3)

CO2.	Applications of various operators of Python.	Application(Level K3)
CO3.	Review the Python programs with variables, loop, functions and operators.	Analysis(Level K4)
CO4.	Analyze the Python programs with variables, loop, functions and operators.	Analysis(Level K4)
CO5.	Develop application with Python core concepts.	Synthesis(Level K5)
MPCSL4 / Core-X	**Dot Net Programming Lab**	
CO1.	Develop simple VB.NET program using forms.	Application(Level K3)
CO2.	Apply simple VB.NET program using forms.	Application(Level K3)
CO3.	Execute VB.NET application with various controls.	Analysis(Level K4)
CO4.	Update database using SQL server.	Synthesis(Level K5)
CO5.	Evaluate database using SQL server.	Synthesis(Level K5)
MPCSE2 / Elective-II	**Principles of Compiler Design**	
CO1.	Examine the basic function of compiler and interpreter	Comprehension (Level K2)
CO2.	Understand the core concepts of phases of compiler	Comprehension (Level K2)
CO3.	Apply Context Free Grammar for simplify the expression using different kinds of parsers	Application(Level K3)
CO4.	Interpret the code generation and optimization process	Analysis(Level K4)
CO5.	Evaluate the code generation and optimization process	Synthesis(Level K5)
MPCSE2 / Elective-II	**Client Server Computing**	
CO1.	Discuss the core concept of Client / Server technology	Comprehension (Level K2)
CO2.	Schedule the software required to establish Client/Server computing	Comprehension (Level K2) Application(Level K3)
CO3.	Appraise the Online Transaction processing tools and procedures	Application(Level K3)

		Analysis(Level K4)
CO4.	Set up Distributed system management components and design Client/Server Application.	Synthesis(Level K5) Evaluation (Level K6)
CO5.	To develop a Client Server based applications	Application(Level K3) Analysis(Level K4)
MPCSE2 / Elective-II	**Neural Networks**	
CO1.	Get the idea about basics of Neural network	Comprehension (Level K2)
CO2.	Describe the concepts of pattern recognition	Comprehension (Level K2) Application(Level K3)
CO3.	Examine the concept of neuron and multilayer perceptron	Analysis(Level K4)
CO4.	Analyze Kohenen Self–Organizing Networks and Hopfield Networks of Neural network	Analysis(Level K4) Synthesis(Level K5)
CO5.	Design and develop applications using Neural Networks	Application(Level K3)
MPCSC7 / Core-XI	**Big Data Analytics**	
CO1.	Understand the concept of Big data techniques, environment, framework and Hadoop ecosystem	Comprehension (Level K2)
CO2.	Apply data management concepts in MYSQL database	Application(Level K3)
CO3.	Analyze Hadoop components and their uses for big data processing	Analysis(Level K4)
CO4.	Examine the impact of big data for business decisions and strategy	Analysis(Level K4)
CO5.	Manage large-scale analytics tools to solve some open big data problems	Synthesis(Level K5)
MPCSC8 / Core-XII	**Software Project Management**	
CO1.	Review the basic concepts of software project management	Comprehension (Level K2)

CO2.	Get the idea about various SDLC models.	Comprehension (Level K2)
CO3.	Apply forward pass and backward pass to find critical path.	Application(Level K3)
CO4.	Analyze the behaviours of team members in an organization.	Analysis (Level K4)
CO5.	Acquire knowledge about cost monitoring and contract management.	Synthesis (Level K5)
MPCSC9 / Core-XIII	**PHP and MYSQL**	
CO1.	Understand the basic concepts of PHP and MYSQL.	Comprehension (Level K2)
CO2.	Describe the basic concepts of PHP and MYSQL.	Comprehension (Level K2)
CO3.	Illustrate String, array, mathematical, date and time functions in PHP	Application(Level K3)
CO4.	Examine the regular expressions and file system of PHP.	Analysis(Level K4)
CO5.	To validate database queries in PHP using MYSQL.	Synthesis(Level K5)
MPCSL5 / Core-XIV	**PHP and MYSQL - LAB**	
CO1.	Describe String functions and regular expressions.	Application(Level K3)
CO2.	Apply String functions and regular expressions.	Application(Level K3)
CO3.	Demonstrate the database connectivity with MYSQL database.	Analysis(Level K4)
CO4.	Develop web pages using PHP and MYSQL.	Synthesis(Level K5)
CO5.	Evaluate web pages using PHP and MYSQL.	Synthesis(Level K5)
MPCSL6 / Core-XV	**Mat Lab**	
CO1.	Illustrate simple mathematical functions/equations in MATLAB.	Application(Level K3)
CO2.	Interpret simple mathematical functions and operations theorem using plots or display.	Analysis(Level K4)
CO3.	Visualize simple mathematical functions and operations theorem using plots or display.	Analysis(Level K4)
CO4.	Describe the overall structure of MATLAB program to display required output.	Analysis(Level K4)

CO5.	Test the overall structure of MATLAB program to display required output.	Analysis(Level K4)
MPCSE3 / Elective-III	**Mobile Computing**	
CO1.	Understand the concept of communication medium and multiplexing in telephone network.	Comprehension (Level K2)
CO2.	Comprehend the routing mechanism and frequency allocation in GSM.	Comprehension (Level K2)
CO3.	Deploy the GPRS concept for packet data transfer in mobile by using GPRS.	Analysis(Level K4)
CO4.	Evaluate the GPRS concept for packet data transfer in mobile by using GPRS.	Synthesis(Level K5)
CO5.	Acquire the knowledge on WAP, CDMA, 3G network and spectrum techniques in wireless network.	Comprehension (Level K2) Application(Level K3)
MPCSE3 / Elective-III	**Software Engineering**	
CO1.	Discuss the stages of software development life cycle	Comprehension (Level K2) Application(Level K3)
CO2.	Examine various Software development life cycle models	Comprehension (Level K2)
CO3.	Analyze the role of project management including requirement gathering, planning, designing and maintenance	Analysis(Level K4)
CO4.	Evaluate various testing principles on software project for risk management	Synthesis(Level K5) Evaluation (Level K6)
CO5.	Design and communicate ideas about software system solution at different levels	Synthesis(Level K5)
MPCSE3 / Elective-III	**Robotics**	
CO1.	Get the idea about automation and robots	Comprehension (Level K2)
CO2.	Interpret the basic concepts of robotic technology and its classification	Application(Level K3)
CO3.	Analyze various types of grippers	Analysis(Level K4)

CO4.	Collect knowledge about robot sensor and vision	Synthesis(Level K5)
CO5.	Evaluate robot control systems and safety	Evaluation (Level K6)
MPCSC10 / Core-XVI	**Digital Image Processing**	
CO1.	Recognize the fundamental elements of DIP and representation of an image in multi dimensional aspects.	Comprehension (Level K2)
CO2.	Apply arithmetic and logical operations on image enhancement process.	Application(Level K3)
CO3.	Interpret the knowledge on compression techniques for security of an image.	Analysis(Level K4)
CO4.	Analyse the knowledge on compression techniques for security of an image.	Analysis(Level K4)
CO5.	Verify various deduction mechanisms in image segmentation.	Synthesis(Level K5)
MPCSE4 / Elective-IV	**Grid and Cloud Computing**	
CO1.	Understand the basic concepts of Grid and Cloud computing.	Comprehension (Level K2)
CO2.	Describe the architecture of Grid and Cloud computing.	Comprehension (Level K2) Application(Level K3)
CO3.	Acquire knowledge about Grid Scheduling and Cloud Computing services.	Analysis(Level K4)
CO4.	Analyse about Grid Scheduling and Cloud Computing services.	Analysis(Level K4)
CO5.	Validate Cloud services by using various cloud service providers such as Amazon, Google and Microsoft.	Synthesis(Level K5)
MPCSE4 / Elective-IV	**Internet of Things**	
CO1.	Understand the basic concepts of IoT	Comprehension (Level K2)
CO2.	Classify the various IoT Architecture	Comprehension (Level K2)
CO3.	Analyze various Protocols of IoT	Analysis(Level K4)
CO4.	Construct portable IoT with RASPBERRY Pi and ARDUINO	Synthesis(Level K5)

CO5.	Deploy an IoT application and connect to the cloud	Evaluation (Level K6)
MPCSE4 / Elective-IV	**Soft Computing**	
CO1.	Discuss the nature of soft computing and its applications	Comprehension (Level K2)
CO2.	Apply soft computing techniques in small applications	Application(Level K3)
CO3.	Analyze various soft computing techniques to solve real life problems	Analysis(Level K4)
CO4.	Evaluate the basis of Fuzzy logic, fuzzy relations and defuzzification techniques	Evaluation (Level K6)
CO5.	Identify and select a suitable soft computing technology to solve the problems	Application(Level K3) Evaluation (Level K6)
MPCSPR / Core-XVII	**Project Work**	
CO1.	Understand the problem.	Comprehension (Level K2)
CO2.	Implement the real time application.	Application(Level K3)
CO3.	Execute the real time application.	Application(Level K3)
CO4.	Analyze various testing methods.	Analysis (Level K4)
CO5.	Verify the expected results in real time applications.	Synthesis(Level K5)

PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES

PG DEPARTMENT OF COMPUTER SCIENCE

B.C.A - SKILL-BASED COURSES, NON-MAJOR ELECTIVE COURSES, EXTRA-CREDIT COURSES & VALUE-ADDED COURSES

PSO, PO & CO STATEMENTS / 2019

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	Able to work as software programmer, system and network administrator, web designer faculty for computer science and computer applications
PSO2	Able to design and develop computer applications for Business problems.
PSO3	Able to create platforms to become an entrepreneur and a relish for higher studies such as M.C.A., M.Sc., etc.,
PSO4	Apply standard Computer science practices and strategies in real-time software project development.
PSO5	Work with and communicate effectively with professionals in various fields and persue life long professional development in computing.
BCA	
BCA / PROGRAMMES OUTCOMES	
POs	**Description of POs**
PO1	Understand the Concepts of key areas of Computer Science.

PO2	Analyze and apply latest technologies to solve problems in the areas of Computer Applications.
PO3	Develop various real-time applications using latest technologies and programming languages.
PO4	Possess Strong foundation for their higher studies.
PO5	Become employable in various IT companies and Government jobs.
PO6	Develop practical skills to provide solutions to industry, society and Business.

BCA/ COURSE OUTCOMES		
	Description of COs	**Bloom's Taxonomy / Cognitive Domain**
MUBCC1 / Core-I	**Digital Electronics**	
CO1.	Gain the knowledge of input and output devices, Number System, Simplification Techniques, Combinational and Sequential Circuits.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Understand the fundamental concepts and techniques used in digital electronics	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply the concepts of Boolean Algebra, Logic gates, Logic Variables and Truth tables to simplify equations.	Applications (Level K3)
CO4.	Analyze combinational logic in terms of Adder, Subtractor and Multiplexer circuits.	Applications (Level K3) Analysis (Level K4)
CO5.	Comprehend the combinational logic in terms of Adder, Subtractor and Multiplexer circuits	Comprehension (Level K3)
MUBCL1 / Core-II	**Multimedia and Animation Lab**	
CO1.	Comprehend the knowledge on designing the image in corel draw.	Comprehension (Level K2)

CO2.	Describe and designing the image in Corel draw.	Synthesis (Level K5)
CO3.	Evaluate the appropriate tools used for designing the image in Photoshop.	Synthesis (Level K5)
CO4.	Design animated movies using Macromedia flash.	Analysis (Level K4)
CO5.	Apply various tools available in Macromedia flash and create simple animation.	Applications (Level K3)
MUBCA1 / Allied-I	**Principles of Management**	
CO1.	Understand the concept of levels of management, objectives of management, process of planning, types of Organization and leadership quality.	Knowledge (Level K1)
CO2.	Describe the concept of levels of management, objectives of management, process of planning, types of Organization and leadership quality.	Comprehension (Level K2)
CO3.	Summarize the characteristics and situational theories of leadership.	Knowledge (Level K1) Comprehension (Level K2)
CO4.	Discuss the important factor for types of organization and responsibility of authorities.	Comprehension(Level K2) Applications (Level K3)
CO5.	Acquire the knowledge on efficient communication in management	Analysis (Level K4)
MUBCHL1 / SBC-I	**HTML Programming Lab**	
CO1.	Classify various HTML tags.	Comprehension (Level K2) Applications (Level K3)
CO2.	Illustrate HTML tags in simple programs.	Analysis (Level K4)
CO3.	Apply HTML tags in simple programs.	Applications (Level K3) Analysis (Level K4)

CO4.	Design static webpage using Basic HTML tag.	Synthesis (Level K5)
CO5.	Create website by applying all the available HTML tags.	Evaluation (Level K6)
MUBCC2 / Core-III	**Programming in C**	
CO1.	Recall and understand the fundamentals of C programming to acquire the programming logic, use of program instruction, Syntax and programming structure.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Describe the concepts of decision making branching and looping.	Knowledge (Level K1)
CO3.	Understand the concepts of decision making branching and looping.	Knowledge (Level K1) Comprehension (Level K2)
CO4.	Implement different operations on arrays and functions to solve the problem.	Applications (Level K3)
CO5.	Execute file operations to preserve data in physical disk.	Applications (Level K3)
MUBCL2 / Core-IV	**Programming in C Lab**	
CO1.	Read and understand the execution of programs written in C language.	Knowledge (Level K1)
CO2.	Trace the execution of programs written in C language.	Comprehension (Level K2)
CO3.	Implement various concepts in C.	Application(Level K3)
CO4.	Implement programs with pointers and arrays, perform pointer arithmetic and use the pre-processor.	Application(Level K3)
CO5.	Write the C code for a given algorithm.	Analysis(Level K4) Synthesis (Level K5)
MUBCA2 / Allied-II	**Discrete Mathematics**	
CO1.	Recall the basic concepts of Mathematics.	Knowledge (Level K1)
CO2.	Impart different kinds of Matrices, Equations, Sets, Relations and Graphs.	Knowledge (Level K1)
CO3.	Comprehend different kinds of Matrices, Equations, Sets, Relations and Graphs.	Comprehension (Level K2)

CO4.	Solve the equations to find the roots.	Comprehension (Level K2) Applications (Level K3)
CO5.	Analyze the real world problems using Graph Theory.	Analysis (Level K4)
MUBCEC2 / SBC-II	**E-Commerce**	
CO1.	Recollect the concepts of e-commerce and its types, EDI and e-security protection.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Comprehend the role of EDI in current scenario.	Comprehension (Level K2)
CO3.	Deploy the types of firewalls for security in network.	Applications (Level K3)
CO4.	Applications in different e-commerce technologies.	Analysis (Level K4)
CO5.	Categorize the e-commerce and apply in different e-commerce technologies.	Analysis (Level K4)
MUBCC3 / Core-V	**Object Oriented Programming with C++**	
CO1.	Get an idea about object oriented paradigm with concepts of streams, classes, functions, data and objects and also recollect the concepts of files.	Knowledge (Level K1
CO2.	Classify difference between object oriented programming and procedural oriented language and data types in C++.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply dynamic memory management techniques using pointers, constructors, destructors, etc.	Knowledge (Level K1) Applications (Level K3)
CO4.	Acquire the concept of polymorphism and apply inheritance with the understanding of early and late binding.	Applications (Level K3) Analysis (Level K4)
CO5.	Validate the use of various OOPs concepts with the help of programs.	Analysis (Level K4) Synthesis (Level K5)

MUBCC4 / Core-VI	**Data Structures**	
CO1.	Recognize fundamental concepts of Data structures, space complexity and time complexity.	Knowledge(Level K1)
CO2.	Understand linear data structures such as stacks, queues, linked list and non linear data structures such as trees and Graphs.	Knowledge(Level K1) Comprehension (Level K2)
CO3.	Apply appropriate data structure for a given application.	Applications(Level K3)
CO4.	Implement different searching and sorting techniques.	Applications(Level K3)
CO5.	Analyze efficient algorithms by acquiring knowledge about time and space complexities of the algorithms.	Analysis(Level K4)
MUBCL3 / Core-VII	**Object Oriented Programming with C++ Lab**	
CO1.	Understand Object oriented features and C++ concepts.	Comprehension (Level K2)
CO2.	Apply Object oriented features and C++ concepts.	Application (Level K3)
CO3.	Practice to solve the real world problems.	Application (Level K3)
CO4.	Apply to solve the real world problems.	Application (Level K3)
CO5.	Experiment various data structure concepts using C++.	Analysis (Level K4)
MUBCL4 / Core-VIII	**Office Automation and Tally Lab**	
CO1.	Practice MS-Office package and do the documentation, calculation, presentation and manipulating the tables.	Applications(Level K3)
CO2.	Describe MS-Office package and do the documentation, calculation, presentation and manipulating the tables.	Applications(Level K3)
CO3.	Get idea about creation and alteration of company profile and Balance sheet.	Comprehension (Level K2)
CO4.	Apply various accounting voucher entries.	Applications(Level K3)

CO5.	Acquire the knowledge in bank reconciliation statement preparation and stock summary	Analysis(Level K4)
MUBCA3 / Allied-III	**Business Accounting**	
CO1.	Understand the accounting concept, conversion, methods and its rules.	Knowledge(Level K1)
CO2.	Acquire knowledge for preparation of journal and Ledger.	Analysis(Level K4)
CO3.	Summarize the ledger balance and check the arithmetical accuracy of books of accounts.	Applications(Level K3)
CO4.	Applications of ledger balance and check the arithmetical accuracy of books of accounts.	Applications(Level K3)
CO5.	Prepare Financial statement of sole trading concern with accounting principles.	Synthesis(Level K5)
MUBCHR3 / SBC-III	**SBC-Human Rights**	
CO1.	Know the basic rights and freedoms, regardless of their political, economical and cultural systems.	Knowledge (Level K1)
CO2.	Understand the importance and historical growth of the Human Rights.	Knowledge (Level K1)
CO3.	Describe historical growth of the Human Rights.	Comprehension (Level K2)
CO4.	Demonstrate the awareness of international context of human rights.	Comprehension (Level K2) Application (Level K3)
CO5.	Categorize the modern issues regarding child and women.	Analysis (Level K4)
MUBCN1 / NME-I	**Internet and its Applications**	
CO1.	Classify the types of networks and function of computers.	Comprehension (Level K2)
CO2.	Describe the types of networks and function of computers.	Comprehension (Level K2)
CO3.	Practice mailing in internet.	Applications(Level K3)
CO4.	Describe the applications of internet.	Applications(Level K3)
CO5.	Criticize the applications of internet.	Applications(Level K3)
MUBCC5 / Core-IX	**Java Programming**	

CO1.	Recollect the OOPs concepts such as Class, Inheritance, Encapsulation and Polymorphism.	Knowledge(Level K1) Comprehension (Level K2)
CO2.	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.	Knowledge(Level K1) Comprehension (Level K2)
CO3.	Implement programs using more advanced features such as Interface, Packages and Multithreading	Applications(Level K3)
CO4.	Analyze differences between application program and applets, applet lifecycle and graphics programming	Analysis(Level K4)
CO5.	Validate Java Programs using Stream Classes and files	Synthesis(Level K5)
MUBCC6 / Core-X	**Operating System**	
CO1.	Recollect the concept of fundamental aspect of operating system	Knowledge(Level K1)
CO2.	Understand the concept of scheduling algorithms, Deadlock, process management and memory management.	Knowledge(Level K1)
CO3.	Describe the concept of scheduling algorithms, Deadlock, process management and memory management.	Comprehension (Level K2)
CO4.	Sketch the Threats, Memory management and production policies.	Applications(Level K3)
CO5.	Acquire the knowledge about file management.	Analysis(Level K4)
MUBCL5 /Core-XI	**Web Technology Lab**	
CO1.	Discuss the core concepts of web programming such as Java script, JSP and PHP.	Comprehension (Level K2)
CO2.	Describe the core concepts of web programming such as Java script, JSP and PHP.	Comprehension (Level K2)
CO3.	Apply interactive web pages using JavaScript.	Applications(Level K3)
CO5.	Design interactive web pages using JavaScript.	Applications(Level K3)

CO5.	Validate server side scripting using JSP and PHP.	Synthesis(Level K5)
MUBCL6 / Core-XII	**Java Programming Lab**	
CO1.	Sketch the Oops concepts and gain the knowledge of Java and Applet.	Applications(Level K3)
CO2.	Describe the Oops concepts and gain the knowledge of Java and Applet.	Applications(Level K3)
CO3.	Implement core java concepts.	Analysis(Level K4)
CO4.	Create simple stand alone application using Core Java and remote applications using Applet.	Synthesis(Level K5)
CO5.	Evaluate simple stand alone application using Core Java and remote applications using Applet.	Synthesis(Level K5)
MUBCA4 / Allied-IV	**Resource Management Techniques**	
CO1.	Recall and describe the concept of Operation Research.	Comprehension (Level K2)
CO2.	Apply transportation and assignment problem to allocate resources.	Applications(Level K3)
CO3.	Acquire the knowledge about game theory.	Analysis(Level K4)
CO4.	Validate network scheduling by PERT and CPM.	Synthesis(Level K5)
CO5.	Evaluate network scheduling by PERT and CPM.	Synthesis(Level K5)
MUBCNA4 / SBC-IV	**Numerical Aptitude**	
CO1.	Recollect and describe the basic concepts of logical reasoning	Knowledge(Level K1) Comprehension (Level K2)
CO2.	Discuss problem solving and reasoning ability	Comprehension (Level K2)
CO3.	Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Applications(Level K3)
CO4.	Apply various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Applications(Level K3)

CO5.	Critically evaluate various real life situations by resorting to analysis of key issues and factors.	Analysis(Level K4)
MUBCC7 / Core-XIII	**Relational Database Management System**	
CO1.	Remember the basic concepts and applications of database system	Knowledge(Level K1)
CO2.	Understand the basic concepts and applications of database system	Comprehension (Level K2)
CO3.	Get the idea about various data models which describes the structure of database	Comprehension (Level K2)
CO4.	Design principles using ER models and Normalization approach	Comprehension (Level K2) Applications(Level K3)
CO5.	Interpret SQL interface of a RDBMS package to create, secure, maintain and query a database and PL/SQL programming using Triggers and Cursors	Analysis(Level K4)
MUBCL7 / Core-XIV	**Dot Net Programming Lab**	
CO1.	Understand the database connectivity with application programming.	Analysis (Level K4)
CO2.	Demonstrate the database connectivity with application programming.	Analysis (Level K4)
CO3.	Design and execute different kinds of tasks in real time application.	Applications(Level K3)
CO4.	Apply different kinds of tasks in real time application.	Analysis (Level K4)
CO5.	Validate the results for the given input data.	Synthesis (Level K5)
MUBCL8 / Core-XV	**Relational Database Management System Lab**	
CO1.	Apply constraints in tables.	Analysis (Level K4)
CO2.	Figure out the need and use of database in application development.	Application (Level K3)
CO3.	Apply the uses of database in application development.	Application (Level K3)
CO4.	Describe the concepts of triggers and cursors.	Synthesis(Level K5)

CO5.	Evaluate the concepts of triggers and cursors.	Synthesis(Level K5)
MUBCE1 / Elective-I	**Software Engineering**	
CO1.	Remember the stages of software development life cycle.	Knowledge(Level K1)
CO2.	Understand the stages of software development life cycle.	Comprehension (Level K2)
CO3.	Examine various Software development life cycle models.	Applications(Level K3) Analysis(Level K4)
CO4.	Analyze the role of project management including requirement gathering, planning, designing and maintenance.	Analysis(Level K4)
CO5.	Evaluate various testing principles on software project for risk management.	Synthesis(Level K5)
MUBCE1 / Elective-I	**Cloud Computing**	
CO1.	Define cloud computing and get the idea about cloud architecture	Knowledge(Level K1)
CO2.	Understand different cloud services	Comprehension (Level K2)
CO3.	Interpret Cloud Services ,security, and architecture	Analysis(Level K4)
CO4.	Examine cloud mail services	Evaluate (Level K6)
CO5.	Apply Cloud Services in real time	Applications(Level K3)
MUBCE1 / Elective-I	**PC Maintenance and Trouble Shooting**	
CO1.	Keep in mind the peripherals, processors, configuration and trouble shoot the problem to the system.	Knowledge(Level K1)
CO2.	Get an idea of installation, working principle and maintenance of secondary storage device.	Comprehension (Level K2)
CO3.	Deploy the different kinds of equipment for diagnose the problem and trouble shoot it.	Analysis(Level K4)
CO4.	Acquire the knowledge on servicing the switches, cables and connectors.	Applications(Level K3)
CO5.	To Apply Trouble shooting techniques in real time	Applications(Level K3)

		Analysis(Level K4)
MUBCE2 / Elective-II	**Organizational Behaviour**	
CO1.	Remember the organizational behaviours like attitudes, personality and communication	Knowledge(Level K1)
CO2.	Understand the learning principles, motivation theories and organizational conflicts	Comprehension (Level K2)
CO3.	Deploy the stress management by avoiding job frustration.	Applications(Level K3)
CO4.	Acquire the knowledge on resolve the conflicts by efficient communication	Analysis(Level K4)
CO5.	To develop creative and innovative ideas that could positively shape the organizations	Evaluate (Level K6)
MUBCE2 / Elective-II	**Information Security**	
CO1.	Get an idea about information Security basis, Security Investigation, Security Analysis, Security models and Security Physical Design	Knowledge (Level K1)
CO2.	Understand Security Investigation and Security Analysis,	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Analyse Security models.	Application (Level K3) Analysis (Level K4)
CO4.	Figure out the Physical design of the Security	Analysis (Level K4)
CO5.	Evaluate the Security and Analysis process.	Synthesis(Level K5)
MUBCE2 / Elective-II	**Big Data Analytics**	
CO1.	Recall and Understand the concept of Big data techniques, environment, framework and Hadoop ecosystem	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Apply Statistical data analysis and tools to manage and analyze the big data	Applications(Level K3)
CO3.	Analyze Hadoop components and their uses for big data processing	Analysis(Level K4)

CO4.	Examine the impact of big data for business decisions and strategy	Analysis(Level K4)
CO5.	Manage large-scale analytics tools to solve some open big data problems	Synthesis(Level K5)
MUBCOS5 / SBC-V	**Open Source Technology**	
CO1.	Recall the concepts of Open Source, Linux, Java Script and PHP.	Knowledge (Level K1)
CO2.	Describe the concepts of Open Source, Linux, Java Script and PHP.	Comprehension (Level K2)
CO3.	Demonstrate the basics of Open Source Software.	Application (Level K3)
CO4.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)
CO5.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)
MUBCC8 / Core- XVI	**Data Communication and Networks**	
CO1.	Recall the networking concepts, Transmission media and OSI layers of Network.	Knowledge(Level K1)
CO2.	Describe the networking concepts, Transmission media and OSI layers of Network.	Comprehension(Level K2)
CO3.	Compare OSI & TCP/IP models.	Knowledge(Level K1) Comprehension (Level K2)
CO4.	Deploy the elementary Data link protocols.	Applications(Level K3)
CO5.	Review transport service and Transmission control protocol like DNS, Email.	Synthesis(Level K5)
MUBCC9 / Core-XVII	**Computer Graphics**	
CO1.	List the display devices and recognize the Viewing and clipping algorithms.	Knowledge(Level K1)
CO2.	Comprehend the attributes of output primitives and geometric Transformation.	Comprehend(Level K2)
CO3.	Describe the attributes of output primitives and geometric Transformation.	Comprehend(Level K2)

CO4.	Demonstrate the algorithms for drawing lines & circle.	Applications(Level K3)
CO5.	Analyze the 2D and 3D viewing and clipping algorithms.	Analysis(Level K4)
MUBCPR / Core-XVIII	**Project Work**	
CO1.	Understand the problem.	Comprehension (Level K2)
CO2.	Implement & execute the real time application.	Application(Level K3)
CO3.	Apply& execute the real time application.	Application(Level K3)
CO4.	Analyze various testing methods.	Analysis (Level K4)
CO5.	Verify the expected results in real time applications.	Synthesis (Level K5)
MUBCE3 / Elective-III	**Data Mining and Warehousing**	
CO1.	Understand the basic concepts of Data mining and Data warehousing	Knowledge(Level K1)
CO2.	Analyse various Data mining techniques like Classifications, Clustering, Association Rule Mining, Prediction and related algorithm.	Analysis(Level K4)
CO3.	Choose appropriate Data mining techniques to carry out simple data mining task.	Application(Level K3) Analysis(Level K4)
CO4.	Develop Data mining algorithm to store heterogeneous data.	Synthesis(Level K5)
CO5.	To implement Data mining algorithm.	Application(Level K3)
MUBCE3 / Elective-III	**Digital Image Processing**	
CO1.	Recognize the fundamental elements of DIP and representation of an image in multi dimensional aspects	Comprehension (Level K2)
CO2.	Apply arithmetic and logical operations on image enhancement process	Application(Level K3)
CO3.	Interpret the knowledge on compression techniques for security of an image	Analysis(Level K4)
CO4.	Verify various deduction mechanisms in image segmentation	Synthesis(Level K5)

CO5.	Categorize various compression techniques.	Analysis(Level K4) Synthesis(Level K5)
MUBCE3 / Elective-III	**Software Testing**	
CO1.	Recollect the concept various testing methods	Knowledge(Level K1)
CO2.	Get the idea of White box testing, Black box testing and Integration testing	Comprehension (Level K2)
CO3.	Figure out testing process by Test Planning, Management, execution and Reporting	Analysis(Level K4)
CO4.	Validate the project by using test metrics and measurements	Evaluation (Level K6)
CO5.	To apply the testing procedure in software development process	Application(Level K3)
MUBCSS6 / SBC-VI	**Soft Skills (Oral Practical)**	
CO1.	Describe the reading, writing, listening and communication skills.	Knowledge (Level K1)
CO2.	Discuss the reading, writing, listening and communication skills.	Comprehension (Level K2)
CO3.	Dramatize the day today activities with the help of soft skills.	Application (Level K3)
CO4.	Analyze and improve the skills for employability.	Analysis (Level K4)
CO5.	Analyze and improve the skills for employability.	Analysis (Level K4)
MUBCN2 / NME-II	**Web Designing**	
CO1.	Classify various HTML tags.	Comprehension (Level K2)
CO2.	Apply various HTML tags.	Applications(Level K3)
CO3.	Illustrate HTML tags in simple programs.	Applications(Level K3)
CO4.	Describe HTML tags in simple programs.	Analysis(Level K4)
CO5.	Design websites using HTML tag.	Synthesis(Level K5)
EXTRA - CREDIT PAPERS		

Semester-I / UGEGC	**Green Computing**	
CO1.	Describe basic concepts of green computing	Knowledge(Level K1)
CO2.	Analyze the role of Electric Utilities	Analysis(Level K4)
CO3.	Understand the application areas of Green Computing	Comprehension (Level K2)
CO4.	Implement interfacing of various Green Computing aspects	Analysis(Level K4)
CO5.	Evaluate the various state of the art methodologies	Synthesis(Level K5)
Semester –III / UGEICP	**IPR, Plagiarism, Copy Rights and Patents**	
CO1.	Understand and use the basic concepts of Intellectual property Rights	Knowledge(Level K1)
CO2.	Examine the Concepts of Intellectual property Rights such as Plagiarism, Copyrights, Infringement, Patents and Licensing	Knowledge(Level K1)
CO3.	To identify the significance of practice and procedure of Patents.	Comprehension (Level K2)
CO4.	Understand and use the basic concepts of Intellectual property Rights	Comprehension (Level K2) Applications(Level K3)
CO5.	Examine the Concepts of Intellectual property Rights such as Plagiarism, Copyrights, Infringement, Patents and Licensing	Analysis(Level K4)
Semester –V / UGEMOC	**MOOC ONLINE COURSE**	
CO1.	Understand and use the web services available in Internet	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Know the web resources in Internet.	Analysis (Level K4)
CO3.	Interpret usage of Online courses.	Synthesis (Level K5)

CO4.	Know the available course content of the new technologies.	Analysis (Level K4)
CO5.	Get an idea of New technologies.	Application(Level K3)
VALUE ADDED COURSES		
Semester –II / MUBCHT	**HARDWARE AND TROUBLESHOOTING**	
CO1.	Obtaining knowledge of troubleshoot the hardware components of a computer.	Knowledge (Level K1)
CO2.	Comprehending the troubleshooting techniques for storage devices, input and output devices.	Comprehension (Level K2)
CO3.	Applying the troubleshooting techniques for hardware failures.	Application (Level K3)
CO4.	Examining the troubleshooting techniques in Network, Printers and Mother board.	Analysis (Level K4)
CO5.	Assembling a new system with standard hardware component	Synthesis (Level K5)
Semester –IV / MUCSADPL	**APPLICATION DEVELOPMENT IN PROGRAMMING LANGUAGES**	
CO1.	Acquiring the knowledge of Application Development in Programming Languages	Knowledge (Level K1)
CO2.	Understanding the concept of interpreter and Compiler	Comprehension (Level K2)
CO3.	Illustrating categories of programming languages	Application (Level K3)
CO4.	Correlating various programming languages used in popular website	Analysis (Level K4)
CO5.	Developing simple applications in structured and object oriented Programming Languages.	Synthesis (Level K5)
Semester –VI / MUCSICT	**ICT TOOLS AND TECHNOLOGIES LAB**	
CO1.	Acquiring knowledge about video making and editing techniques	Knowledge (Level K1)
CO2.	Applying different ICT tools for entrepreneurship development	Application (Level K3)
CO3.	Enhancing the digital skill-set required in workplace	Synthesis (Level K5)
CO4.	Appreciation of Technology in everyday life	Analysis (Level K4)
CO5.	Helps them to adjust to the inevitable future changes	Evaluation (Level K6)