

## National Education Society (R.) Jawaharlal Nehru New College of Engineering, Shivamogga



(Approved by AICTE, New Delhi, Certified by UGC 2f & 12B, Accredited by NAAC –'B', UG programs:CE,ME,EEE,ECE,CSE,ISE, ETE PG Programs: MBA, acredited by NBA:1.7.2022 to 30.6.2025, Recognized by Govt. of Karnataka and Affiliated to VTU, Belagavi)

## **INTERNAL QUALITY ASSURANCE CELL (IQAC)**

SI.No	Branch	Sem	Subject	COs
1	MCA	1 <sup>st</sup>	18MCA11 Data Structure	<ol> <li>Demonstrate different data structures, its operations using C programming.</li> <li>Analyse the performance of Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques.</li> <li>Implement some applications of data structures in a high-level language such as C/C++</li> <li>Design and apply appropriate data structures for solving computing problems.</li> <li>Compute the efficiency of algorithms in terms of asymptotic notations for the given problem.</li> </ol>
2	MCA	1 <sup>st</sup>	18MCA12 Os With Unix	<ol> <li>Analyse the basic Operating System Structure and concept of Process Management</li> <li>Analyse the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions.</li> <li>Analyse OS management techniques and identify the possible modifications for the given problem context.</li> <li>Demonstrate the working of basic commands of Unix environment including file processing</li> </ol>

## <u>MCA</u>

				5) Demonstrate the usage of different shell
				commands, variable and AWK filtering to the
				given problem
				1) Apply the basic concepts of networking
				and to analyse different parameters such as
				bandwidth, delay, throughput of the networks
				for the given problem.
				2) Apply different techniques to ensure the
				reliable and secured communication in wired
		1 st	18MCA13	and wireless communication
3	MCA	In	Computer Network	3) Analyse the networking concepts of
				TCP/IP for wired and wireless components
				4) Identify the issues of Transport layer to
				analyse the congestion control mechanism
				5) Design network topology with different
				protocols and analyse the performance using
				NS2
		1 <sup>st</sup>		1) Apply the fundamentals of set theory and
				matrices for the given problem.
				2) Apply the types of distribution, evaluate
				the mean and variance for the given
				casestudy/ problem.
				3) solve the given problem by applying the
	MCA		18MCA14	Mathematical logic concepts
4			Mathematical Foundation	4) Model the given problem by applying the
				concepts of graph theory.
				5) Design strategy using gaming theory
				concepts for the given problem
				6) Identify and list the different applications
				of discrete mathematical concepts in
				computer science.
			18MCA15	1) Identify the suitable research methods and
5	MCA	1 <sup>st</sup>	Research Methodology	articulate the research steps in a proper
			And Ipr	sequence for the given problem.

				2) Carry out literature survey, define the
				problem statement and suggest suitable
				solution for the given problem.
				3) Analyse the problem and conduct
				experimental design with the samplings.
				4) Perform the data collection from various
				sources segregate the primary and secondary
				data
				5) Apply some concepts/section of Copy
				Right Act /Patent Act /Cyber Law/
				Trademark to the given case and develop
				conclusions
				1) Demonstrate different data structures, its
				operations using C programming.
	МСА	1 <sup>st</sup>	18MCA16 DS LAB	2) Analyse the performance of Stack, Queue,
				Lists, Trees, and Hashing, Searching and
				Sorting&; techniques.
				3) Implement some applications of data
6				structures in a high-level language such as
				;C/C++
				4) Design and apply appropriate data
				structures for solving computing problems.
				5) Compute the efficiency of algorithms in
				terms of asymptotic notations for the given
				problem.
				1) Demonstrate the working of basic
				commands of Unix environment including
				file processing
7				2) Apply Regular expression to perform
		- et	18MCA17 Unix	pattern matching using utilities like grep, sed
	MCA	1 <sup>st</sup>	Programming	3) Implement unix commands/ system calls to
			Lab	demonstrate process management
				4) Demonstrate the usage of different shell
				commands, variable and AWK filtering to the

				5) Develop shell scripts for developing the
				simple applications to the given problem.
				1) Apply the basic concepts of networking
				and to analyse different parameters such as
				bandwidth, delay, throughput of the networks
				for the given problem.
				2) Apply different techniques to ensure the
				reliable and secured communication in wired
		. et	18MCA18	and wireless communication
8	MCA	1 <sup>st</sup>	Computer Network Lab	3) Analyse the networking concepts of
				TCP/IP for wired and wireless components
				4) Identify the issues of Transport layer to
				analyse the congestion control mechanism
				5) Design network topology with different
				protocols and analyse the performance using
				NS2
			18MCA19BC Bridge Course - basic Programing	1) Demonstrate the key concepts introduced
				in C programming by writing and executing
				the Programs.
				2) Demonstrate the concepts of structures and
				pointers for the given application/problem
				3)Implement the
				single/multi-dimensional array for the given
9	MCA	1 <sup>st</sup>		problem
				4) Demonstrate the application of logic gates
				in solving some societal/industrial
				problems.
				5) Analyze how memory organization,
				operations, instruction sequencing and
				interrupts are
				Useful in executing the given program
				1) Apply the basic concepts of database
			18MCA21	management in designing the database for the
10	MCA	2 <sup>nd</sup>	Database Management	given problem
	MCA		System	2) Design entity-relationship diagrams to the
				given problem to develop database

				<ul> <li>application with appropriate fields and validations</li> <li>3) Implement a database schema for the given problem domain.</li> <li>4) Formulate and execute SQL queries to the given problem.</li> <li>5) Apply normalization techniques to</li> </ul>
				improve the database design to the given problem.
11	MCA	2 <sup>nd</sup>	18MCA22 Object Oriented Programming with Java	<ol> <li>Demonstrate the basic programming constructs of Java and OOP concepts to develop Java programs for a given scenario.</li> <li>Illustrate the concepts of generalization and run time polymorphism applications to develop reusable components</li> <li>Demonstrate the usage of Packages, Interfaces, Exceptions and Multithreading in building given applications.</li> <li>Apply Enumerations, Wrappers, Auto boxing, Collection framework and I/Ooperations for effective coding to the given problem</li> <li>Implement the concepts of Applets, and networking using Java network classes for developing the distributed applications to the given problem</li> </ol>
12	MCA	2 <sup>nd</sup>	18MCA23 Web Technologies	<ol> <li>Apply the features JQuery for the given web-based problem.</li> <li>Demonstrate the development of XHTML documents using JavaScript and CSS</li> <li>Illustrate the use of CGI and Perl programs for different types of server- side; applications</li> <li>Design and implement user interactive dynamic web-based applications.</li> </ol>

13       MCA       2 <sup>nd</sup> 18MCA24 Software Engineering       1) Identify and define different requirements for the given problem and present in the IEEE format.         13       MCA       2 <sup>nd</sup> 18MCA24 Software Engineering       1) Use modern tool to create dynamic diagrams to represent the design for the given problem.         13       MCA       2 <sup>nd</sup> 18MCA24 Software Engineering       10 Taw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         14       MCA       2 <sup>nd</sup> 18MCA25 Software Engineering       10 Paiw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       10 Paily in the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       10 Analyze the given case and analyze the given given problem case/problem and infer from the given case and analyze the given case and analyze the given system.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       10 Analyze the given case and analyze the given gical or administrative controls) to mitigate the given case on society and National Economy.					5) Demonstrate applications of Angular JS
<ul> <li>MCA 2<sup>nd</sup></li> <li>18MCA24 Software Engineering</li> <li>MCA 2<sup>nd</sup></li> <li>18MCA251 Cybersecurity</li> <li>MCA 2<sup>nd</sup></li> <li>18MCA264 Software Engineering</li> <li>18MCA24</li> <li>Software Engineering</li> <li>18MCA25</li> <li>19 Jaar class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.</li> <li>4) Analyse the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open source tool.</li> <li>5) Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.</li> <li>1) Apply IT ACT (Cyber law) to the given case and analyze the gap if exists</li> <li>2) Analyze the working of cyber security principles in designing the system.</li> <li>3) Analyze the given problem and articulate consequences on Society and National Economy.</li> <li>4) Examine relevant network defense/web application tool to solve</li> </ul>					and JQuery for the given problem
13 MCA 2 <sup>nd</sup> 18MCA24 Software Engineering 2 <sup>nd</sup> 18MCA24 NCA 2 <sup>nd</sup> 2 <sup>nd</sup> 18MCA25 Software Engineering 2 <sup>nd</sup> 18MCA26 Software Engineering 2 <sup>nd</sup> 18MCA26 Software Engineering 2 <sup>nd</sup> 10 <sup>n</sup>					1) Identify and define different requirements
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13       MCA       2nd       18MCA24 Software Engineering       18MCA24 Software Engineering       3) Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         13       MCA       2nd       18MCA24 Software Engineering       3) Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         14       MCA       2nd       18MCA251 Cybersecurity       1)       Apply       IT       ACT       (Cyber law) to the given case and analyze the gay if exists         14       MCA       2nd       18MCA251 Cybersecurity       1)       Apply       IT       ACT       (Cyber law) to the given case and analyze the gay if exists         14       MCA       2nd       18MCA251 Cybersecurity       3)       Analyze       the working of cyber security principles in designing the system.         14       MCA       2nd       18MCA251 Cybersecurity       3)       Analyze       the working of cybercrime, vulnerability, threat), develop       a       strategy       (physical, logical or administrative controls) to mitigate the problem       3)       Analyze       the given cybercrime, vulnerability, threat), develop       a       a       a         14					format.
13       MCA       2nd       18MCA24 Software Engineering       3) Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         13       MCA       2nd       18MCA24 Software Engineering       3) Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         14       MCA       2nd       18MCA251 Cybersecurity       1) Apply IT ACT (Cyber law) to the given case/problem and infer from the given case and analyze the gap if exists         14       MCA       2nd       18MCA251 Cybersecurity       1) Apply IT ACT (Cyber law) to the given case and analyze the gap if exists         14       MCA       2nd       18MCA251 Cybersecurity       3) Analyze the working of cyber security principles in designing the system.         14       MCA       2nd       18MCA251 Cybersecurity       3) Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.					2) Use modern tool to create dynamic
13 MCA 2 <sup>nd</sup> 2 <sup>nd</sup> 18MCA24 Software Engineering 4. Analyse the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open source tool. 3) Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool. 18MCA 2 <sup>nd</sup> 19 Apply 1T ACT (Cyber law) to the given case and analyze the given groblem and represent them using UML notations. 10 Apply 1T ACT (Cyber law) to the given case and analyze the gap if exists 2 <sup>nd</sup> 18MCA251 Cybersecurity 18MCA261 (2) Analyze the working of cyber security principles in designing the system. 3) Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.					diagrams to represent the design for the given
13       MCA       2 <sup>nd</sup> 18MCA24 Software Engineering       3) Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations.         13       MCA       2 <sup>nd</sup> 18MCA24 Software Engineering       4) Analyse the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open source tool.         14       MCA       2 <sup>nd</sup> 18MCA251 Cyber security       5) Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       1)       Apply       IT       ACT       (Cyber law) to the given case and analyze the gap if exists         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze       the working of cyber security principles in designing the system.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze       the given cose and analyze the gap if exists					problem.
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13       MCA       2 <sup>nd</sup> Software Engineering       UML notations.         4) Analyse the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open source tool.       5) Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       1) Apply IT ACT (Cyber law) to the given case and analyze the gap if exists         2)       Analyze the working of cyber security principles in designing the system.         3)       Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.         4)       Examine relevant network defense/web application tool to solve			1	18MCA24	given problem and represent them using
14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity 18MCA251 Cybersecurity       18MCA251 Cybersecurity 18MCA251 Cybersecurity       3)       Analyze the given problem using RSA/open source tool.         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze the given given case and analyze the gap if exists         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze the given cosequences on Society and National Economy.	13	MCA	$2^{nd}$	Software Engineering	UML notations.
14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       18MCA251 Cybersecurity       3)       Analyze       the       working         3)       Analyze       the       given       <				Lingineering	4) Analyse the given system to identify
14       MCA       2 <sup>nd</sup> <ul> <li>I8MCA251 Cybersecurity</li> <li>Cybersecurity</li> <li>Analyze</li> <li>Analyze</li></ul>					actors, use cases to design use case diagrams
14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       18MCA251 Cybersecurity       1       Analyze       the given system         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze       the given system.         10       Apply       IT       ACT       (Cyber law) to the given case/problem and infer from the given case and analyze the gap if exists         2)       Analyze       the working of cyber security principles in designing the system.         3)       Analyze       the given problem (cybercrime, vulnerability, threat), develop         10       Apply       It me given problem and articulate consequences on Society and National Economy.					for the given problem using RSA/open source
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14       MCA       2nd       18MCA251 Cybersecurity       1       Analyze       the given					5) Design the static/dynamic models to meet
14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       1)       Analyze       the given case and analyze the gap if exists         3)       Analyze       the given problem and infer from the given case and analyze       10         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze       the given problem and infer from the given case and analyze         14       MCA       2 <sup>nd</sup> 18MCA251 Cybersecurity       3)       Analyze       the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.         4)       Examine relevant network defense/web application tool to solve					application requirements of the given system
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14MCA2nd18MCA251 Cybersecurity3)Analyzethegivenproblem (cybercrime, vulnerability, threat), developastrategy(physical, logical or administrative controls) to mitigate the problemlogical or administrative controls) to mitigate the consequencesonSociety and National Economy.4)Examinerelevant network defense/web application tool to solve					system.
14       MCA       2 <sup>nd</sup> Cybersecurity       problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.         4)       Examine       relevant network defense/web application tool to solve			1	18MCA251	3) Analyze the given
developastrategy(physical, logical or administrative controls) to mitigatetheproblemandarticulateconsequencesonSocietyandNationalEconomy.4)Examinerelevantnetwork defense/web application tool to solve	14	MCA	$2^{nd}$	Cybersecurity	problem (cybercrime, vulnerability, threat),
Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure					develop a strategy (physical,
the problem and articulate         consequences on Society and National         Economy.         4)       Examine relevant         network defense/web application tool to solve					logical or administrative controls) to mitigate
consequences       on       Society       and       National         Economy.       4)       Examine       relevant         network       defense/web       application       tool to solve					the problem and articulate
Economy.         4)       Examine       relevant         network defense/web application tool to solve					consequences on Society and National
4)Examinerelevantnetwork defense/web application tool to solve					Economy.
network defense/web application tool to solve					4) Examine relevant
					network defense/web application tool to solve

				given cyber security problem and
				evaluate its suitability.
				5) Evaluate provisions
				available in Indian cyber law to handle
				infringement of intellectual property
				rights that happens on the cyber platform.
				1)Apply IT ACT (Cyber
				law) to the given case/problem and infer from
				the given case and analyze the
				gap if exists
				2)Analyze the working
				of cyber security principles in designing the
				system
				3)Analyze the given
			18MCA251 Cybersecurity	problem (cybercrime, vulnerability, threat),
		2 <sup>nd</sup>		develop a strategy (physical,
	MCA			logical or administrative controls) to mitigate
15				the problem and articulate
				consequences on Society and National
				Economy
				4)Examine relevant
				network defense/web application tool to solve
				given cyber security problem and
				evaluate its suitability
				5) Evaluate provisions
				available in Indian cyber law to handle
			infringement of intellectual property	
				rights that happens on the cyber platform.
				1) Analyse the new technologies that provide
			10 MC 4 25 4	interactive devices and interfaces.
16	MCA	2 <sup>nd</sup>	User Interface	2) Apply the guidelines to develop the UID
	MCA	2	Design	and evaluate for the given problem.
			-	
				3) Apply the development methodologies

17         MCA         2 <sup>nd</sup> 18MCA27 DBMS Lab         118MCA28 DBMS Lab         1) Design entity-relationship diagrams to solve given normalization techniques in or and y given problem.           18         MCA         2 <sup>nd</sup> 18MCA27 DBMS Lab         1) Design entity-relationship diagrams to solve given normalization techniques in or and y given problem.           19         MCA         2 <sup>nd</sup> 18MCA28 Java         1					issues, Understand Direct Manipulation and
17         MCA         2 <sup>nd</sup> 18MCA27 DBMS Lab         118MCA27 DBMS Lab         3) Inplement a database schema for a given problem.           18         MCA         2 <sup>nd</sup> 18MCA27 DBMS Lab         3) Inplement a database and verify for its appropriate normalization for the given problem.           19         MCA         2 <sup>nd</sup> 18MCA28 Java Poclem         3) Inplement suitable methods to integrate database and server-side technologies           19         MCA         2 <sup>nd</sup> 18MCA28 Java Programming         1) Design and develop open sources of ware based mobile application to the given problem.           19         MCA         2 <sup>nd</sup> 18MCA28 Java Programming         1) Demonstrate the fundamental data types and constructs of Java Programming by					Virtual Environment.
17         MCA         2 <sup>nd</sup> 18MCA263 Mobile Application Development         1) Develop effective user interfaces that leverage evolving mobile devices           17         MCA         2 <sup>nd</sup> 18MCA263 Mobile Application Development         3) Implement suitable methods to integrate database and server-side technologies           30         Implement suitable methods to integrate database and server-side technologies           4) Design and develop open source software based mobile application to the given problem.           5) Build and deploy competent mobile application to solve the societal/industrial problems.           18         MCA           2 <sup>nd</sup> 18MCA27 DBMS Lab           18         19           MCA         2 <sup>nd</sup> 18         18MCA27 DBMS Lab           19         MCA           2 <sup>nd</sup> 18MCA28 Faram           19         MCA					4) Discuss the command, natural languages
17       MCA       2nd       18MCA263 Mobile Application Development       1) Develop effective user interfaces that leverage evolving mobile devices         17       MCA       2nd       18MCA263 Mobile Application Development       1) Inplement suitable methods to integrate database and server-side technologies         3) Implement suitable methods to integrate database and server-side technologies       3) Implement suitable methods to integrate database and server-side technologies         4) Design and develop open source software based mobile application to the given problem.       5) Build and deploy competent mobile application to solve the societal/industrial problems.         18       MCA       2nd       18MCA27 DBMS Lab       1) Design entity-relationship diagrams to solve given database applications         19       MCA       2nd       18MCA28 Programming       1) Demonstrate the fundamental data types and constructs of Java Programming by					and issues in design for maintaining QoS.
17         MCA         2 <sup>nd</sup> 18MCA263 Mobile Application Development         1 Develop effective user interfaces that leverage evolving mobile devices           17         MCA         2 <sup>nd</sup> 18MCA263 Mobile Application Development         1 Develop applications using software development kits (SDKs), frameworks and toolkits.           18         MCA         2 <sup>nd</sup> 18MCA263 Mobile Application Development         3 Implement suitable methods to integrate database and server-side technologies           19         MCA         2 <sup>nd</sup> 18MCA28 Poreament         3 Implement suitable methods to integrate database and server-side technologies           19         MCA         2 <sup>nd</sup> 18MCA28 Poreament         1 Design entity-relationship diagrams to improve the database applications           19         MCA         2 <sup>nd</sup> 18MCA28 Poreament         1 Demonstrate the fundamental data types and constructs of Java Programming by					5) Demonstrate techniques for information
17       MCA       2 <sup>nd</sup> 18MCA263 Mobile Application Development       1) Develop effective user interfaces that leverage evolving mobile devices         17       MCA       2 <sup>nd</sup> 18MCA263 Mobile Application Development       3) Implement suitable methods to integrate database and server-side technologies         30       Inplement suitable methods to integrate database and server-side technologies         4) Design and develop open source software based mobile application to the given problem.         5) Build and deploy competent mobile application to solve the societal/industrial problems.         18       10         18       2 <sup>nd</sup> 18       18         19       MCA         2 <sup>nd</sup> 18         19       MCA					search and visualization for the given
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Lab writing executable/interpretable programs.				Programming Lab	writing executable/interpretable programs.

20       MCA       3rd       18MCA31 Database Management System       1       10 Develop reusable and efficient applications using inheritance and multi-threading concepts of java.         20       MCA       3rd       18MCA31 Database Management System       1       Demostrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA31 Database Management System       1) Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA31 Database Management System       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Understand and comprehend the basics of python programming         22       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Categorize Problems based on their Characteristics and Practical Importance         2)Develop       Algorithms in terms of Asymptotic Notations.       3) Compute the Efficiency of Algorithms in terms of Asymptotic Notations.					2) Illustrate the object oriented principles
20       MCA       3rd       18MCA31 Database Management System       1       10 Develop reusable and efficient applications using inheritance and multi-threading concepts of java.         20       MCA       3rd       18MCA31 Database Management System       5) Write java programs to demonstrate the concepts of interfaces, inner classes and I/Ostreams.         20       MCA       3rd       18MCA31 Database Management System       1) Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA31 Database Management System       1) Demonstrate the SQL and relational database design         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Understand and comprehend the basics of python programming         22       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Categorize Problems based on their Characteristics and Practical Importance         2)Develop       Algorithms using Iterative/Recursive Approach       3) Compute the Efficiency of Algorithms in terms of Asymptotic Notations.					with the help of java programs.
20       MCA       3rd       18MCA31 Distance Arrow       18MCA32 Programming Programming System       1) Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA32 Programming Programming using Python       1) Interstand and comprehend the basics of python programming using Python         22       MCA       3rd       18MCA33 Database Maagement System       1) Understand and comprehend the basics of python programming using Python         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming using Python         22       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Categorize Problems based on their Characteristics and Practical Importance         20       MCA       3rd       18MCA33 Design and Analysis of Algorithms       1) Categorize Problems based on their Characteristics and Practical Importance					3) Develop reusable and efficient applications
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20       MCA       3rd       18MCA31 Database Management System       1) Demostrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA32 Programming using Python       1) Demostrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Design and Algorithms       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Design and Algorithms       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Design and Algorithms       1) Understands about file and its applications         3) Understands about file and its applications       1) Understands about file and its applications       1) Categorize Problems based on their Characteristics and Practical Importance         2)Develop       Algorithms <td></td> <td></td> <td></td> <td></td> <td>concepts of java.</td>					concepts of java.
20       MCA       3rd       18MCA31 Database System       networking concepts to develop distributed applications.         21       MCA       3rd       18MCA32 Database System       1) Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model         21       MCA       3rd       18MCA32 Programming using Python       1) Inference the database design in the real world entities         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA32 Programming using Python       1) Understand and comprehend the basics of python programming         21       MCA       3rd       18MCA33 Programming       1) Understand and comprehend the basics of python programming         31       10       10       2) Apply knowledge in real - time applications         31       10       2) Opelop Algorithms using trative/Recursive Approach         31       0       3) Compute the Efficiency of Algorithms in terms of Asymptotic Notations. <td></td> <td></td> <td></td> <td></td> <td>4) Apply client-side programming and</td>					4) Apply client-side programming and
20       MCA       3rd <ul> <li>I8MCA31 Database System</li> <li>I8MCA32 Programming using Python</li> </ul> <ul> <li>I8MCA32 Database</li> <li>Image and the second second</li></ul>					networking concepts to develop distributed
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4)Design the Algorithm using an appropriate design paradigm for solving a given problem				Algorithms	terms of Asymptotic Notations.
design paradigm for solving a given problem					4)Design the Algorithm using an appropriate
					design paradigm for solving a given problem

23       MCA       3rd          18MCA34 System Software           1.) Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.          23       MCA       3rd          18MCA34 System Software           1.) Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.          24       MCA          3rd           18MCA351 Software           3.) Design and implementation examples.          24       MCA          3rd           18MCA351 Software           1/Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases          24       MCA          3rd           18MCA351 Software Testing           1/Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases          25          MCA          3rd           18MCA36 DBMS Lab          25          MCA           3rd           18MCA36 DBMS Lab          26          MCA           3rd           18MCA36 DBMS Lab          26          MCA           3rd					5) Classify problems as P, NP or NP
23       MCA       3rd       18MCA34 System Software       1) Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.         2) Understand the design and implementation of assemblers with implementation examples.       3) Design and implement the linkers and loaders, macro processors and respective implementation examples.         3)       Design and implement the linkers and loaders, macro processors and respective implementation examples.         4)Learn the basic design and working of compilers.         24       MCA         3rd       18MCA351 Software Testing         18MCA351 Software Testing       1)Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases         29Understand the perceptions on testing like levels of testing, generalized pseudocode and with related examples         3)Study the various types of testing         4)Analyse the difference between functional testing and structural testing         5) Analyse the performance of fault based testing         2) Able to create a database with different types of integrity constraints and use SQL, commands such as DDL, DML, DCL, TCL to access data from database objects.         3) Design and implement a database schema for a given problem domain					Complete
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for a given problem domain 4)Perform embedded and nested queries					3) Design and implement a database schema
4)Perform embedded and nested queries					for a given problem domain
					4)Perform embedded and nested queries

				5) Take up real-world problems
				independently.
				1) Apply object oriented programming
				concepts to develop dynamic interactive
				python applications.
				2) Use the procedural statements assignments
			18MCA37	conditional statements loops method calls and
				arrays
26	MCA	3rd	Python Programming	3) Design code and test small python
			Lab	programs with a basic understanding of top
				down design.
				4) Learn how to create GUI and solve real
				world problem using language idioms data
				structures and standard library.
				1) Implement the Concept of Time and Space
				Complexity, Divide & amp; Conquer strategy,
				Dynamic Programming, Greedy & amp;
			18MCA38	approximate algorithms
27	MCA	3rd	Algorithms Lab	2) Describe the methodologies of how to
				analyze an algorithm
				3) Chose a better algorithms to solve the
				problems
				1) Learn the concept of Servlet and its life
				cycle
				2) Understand JSP tags and its services
			10140 4 41	3) Create packages and interfaces Build
28	MCA	$4^{\text{th}}$	Advance Java	Database connection
			Programing	4) Develop Java Server Pages applications
				using JSP Tags.
				5) Develop Enterprise Java Bean
				Applications
			10140442	1) Acquire Knowledge of Building the Web
29	MCA	4 <sup>th</sup>	Advance Web	Applications using PHP, Ruby, Bootstrap,
			Programming	AJAX and XML

				2) Design the Asynchronous Web
				Applications using AJAX.
				3) Understand the terminology of building
				web applications using MVC architecture.
				4) Design responsive web applications using
				Bootstrap.
				1) Acquire knowledge of Basic UML
				Concepts and terminologies Life Cycle of
				Object oriented Development Modeling
				Concepts.
				2) Identify the basic principles of Software
				modelling and apply them in real world
			18MCA43	applications
30	MCA	4 <sup>th</sup>	Object Oriented	3) Produce conceptual models for solving
			Modelling And Design	operational problems in software and IT
				environment using UML
				4) Analyze the development of Object
				Oriented Software models in terms of Static
				behaviour Dynamic behaviour
				5) Evaluate and implement various Design
				patterns
				1) Understand the cloud computing delivery
				model and the enabling technologies
				2) Explain and cloud computing platforms,
				key technology drivers and cloud
		.1	18MCA444	programming/software environments
31	MCA	$4^{\text{th}}$	Cloud Computing	3) Identify the need for cloud computing
			Computing	model and compare various key enabling
				technologies
				4) Analyze and choose an appropriate
				programming environment for building cloud
				applications
				1) Understand the Professional
32	MCA	$4^{th}$	18MCA46	communication at work place.
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			Professional Communication	2) Acquire the knowledge of technical writing and business reporting.				
			Writing	3) Develop the leadership qualities.				
				4) Understand and implement ethical				
				behaviour at work place.				
				1) Designing HTML pages to demonstrate				
			18MCA47 Adv Java Programing Lab	Java Servlets, JSP, Bean, and EJB				
				programs				
				2) Implementing Dynamic HTML using				
				Servlet and demonstration of service				
				methods, auto web page refresh, Session				
33	MCA	$4^{\text{th}}$		tracking using cookie and HTTP Session in				
				Servlet				
				3) Learn the fundamental of				
				connecting to the database.				
				4) Demonstrate JSP (page attributes, action				
				tags, and all basic tags) and types of EJB				
				application				
	MCA	4 <sup>th</sup>	18MCA48 Adv Web Programming Lab	1) Understand, analyze and apply the role of				
				server side scripting languages.				
24				2) Build web application using PHP, Ruby,				
34				Bootstrap, XML and store values in MySQL.				
				3) Build MVC based web applications using				
				Ruby and Rails.				
	MCA	4 <sup>th</sup>		1) Understand the fundamental principles of				
				Object-Oriented analysis, design,				
				development and programming				
35			10140440	2) Demonstrate and represent the UML				
			18MCA49 Object Oriented Programming Lab	model elements to enable visual				
				representation & of the system being				
				developed				
				3) Implement object oriented design model				
				with the help of modern tool, Rational				
				software Architect				

				4) Analyze and differentiate the static and			
				dynamic			
				behaviour of the system for achieving & the			
				intended & functionalities of the system			
				5) Applicability, reasonableness and relation			
				to other design criteria.			
				1) Understand C# and client-server concepts			
			18MCA51 Programming Using C#.net	using .NET Frame Work Components.			
	MCA			2) Apply delegates, event and exception			
				handling to incorporate wit ASP, Win Form,			
		5 <sup>th</sup>		ADO.NET			
36				3) Analyze the use of .NET Components			
				depending on the problem statement.			
				4) Implement & amp; Develop a web based			
				and Console based application with Database			
				Connectivity.			
	MCA			1) Choose the learning techniques and			
		5 <sup>th</sup>	18MCA53 Machine Learning	concept learning			
				2)Identify the characteristics of decision tree			
				and solve problem associated with			
				3) Apply effectively for neural network for			
37				appropriate applications			
				4) Apply Bayesian technique and derive			
				learning rules			
				5)Evaluate hypothesis and investigate			
				instance based learning and reinforced			
				learning			
	MCA	5 <sup>th</sup>		1) Understand constraints and opportunities			
			18MCA542 Internet Of Things	of wireless and mobile networks for Internet			
				of Things.			
38				2) Analyze the societal impact of IoT security			
				events. & Develop critical thinking skills.			
				3) Analyze, design or develop parts of an			
				Internet of Things solution and map it toward			
				selected business model(s)			

				4) Evaluate ethical and potential security				
				issues related to the Internet of Things.				
			18MCA543 Image Processing	1)Explain how digital images are represented				
				and manipulated in a computer, including				
		5 <sup>th</sup>		reading and writing from storage, and				
				displaying				
				2) Be conversant with the mathematical				
39	MCA			description of image processing techniques				
				and know how to go from the equations to				
				code.				
				3) Know the image enhancement,				
				segmentation and compression techniques.				
		5 <sup>th</sup>	18MCA552 Principles Of User Interface Design	1) Use the New technologies that provide				
	MCA			interactive devices and interfaces.				
				2) Apply the process and evaluate UID.				
40				3) Understand direct manipulation and virtual				
				environment.				
				4) Discuss the command, natural languages				
				and issues in design for maintaining QoS.				
				5) Persuade User documentations and				
				information search.				
	MCA	5 <sup>th</sup>	18MCA56 C Sharp .net Lab	1) Understand C# and client-server concepts				
				using .NET Frame Work Components.				
				2) Apply delegates, event and exception				
				handling to incorporate with ASP, Win Form,				
41				and ADO.NET.				
41				3) Analyze the use of .NET Components				
				depending on the problem statement.				
				4) Implement & amp; develop a web based				
				and Console based application with Database				
				Connectivity.				
42	MCA	5 <sup>th</sup>	18MCA57 Mobile Application LAB	1)Illustrate effective user interfaces that				
				leverage evolving; mobile device capabilities				
				2)Develop applications using software				
				development (SD Ks), frameworks and				
				toolkits				

				3 Establish various methods integrate and			
				server-side technologies			
				4)Design and develop open source software			
				based mobile applications			
				5)Build and deploy competent mobile			
				development solutions			
				1) Identify a suitable problem making use of			
				the technical and engineering knowledge			
				gained from previous courses with the			
				awareness of impact of technology on the			
	MCA			society and their ethical responsibilities.			
			18MCA61	2) Ability to segregate work and			
43		6 <sup>th</sup>	Internation	execute/implement projects using appropriate			
			internship	tools.			
				3) Develop skills to disseminate technical and			
				general information by means of oral as well			
				as written presentation and professional			
				skills.			
		6 <sup>th</sup>	18MCA62 Seminar	1) Identify a suitable problem making use of			
	MCA			the technical and engineering knowledge			
				gained from previous courses with the			
				awareness of impact of technology on the			
				society and their ethical responsibilities.			
				2) Ability to segregate work and			
44				execute/implement projects using appropriate			
				tools.			
				3) Develop skills to disseminate technical and			
				general information by means of oral as well			
				as written presentation and professional			
				skills.			
	MCA	6 <sup>th</sup>		1) Identify a suitable problem making use of			
				the technical and engineering knowledge			
45			18MCA63	gained from previous courses with the			
			Major Project	awareness of impact of technology on the			
				society and their ethical responsibilities.			
	1						

		2)	Ability	to	segregate	work	and
		exec	cute/imple	ment	projects usir	ig approp	priate
		tool	s.				
		3) D	Develop sk	ills to	disseminate	technica	al and
		gene	eral inform	natio	n by means c	of oral as	well
		as	written p	oreser	ntation and	profess	sional
		skill	ls.				