| YEAR BRAN CH | COURSE CODE | COURSE NAME | COURSE OBJECTIVES | COURSE OUTCOME'S |
|--------------------|----------------|-------------------------|--|---|
| MSC I-I | MSCCS1 11 | DISCRETE MATHEMATICS | Necessary mathematical concepts that are prerequisite for computer related subjects namely database management systems, knowledge based systems and artificial intelligence First-order logic , quantifier logic and predicator logic Elementary combinations and permutations with repetitions, different methods of solving recurrence relations LO4: concepts and | . Upon completion of this course, the student will be able to 1: apply concepts of sets & relations to lattice problems and determine all the possible paths available in directed paths 2: analyze the different types of logic in order to establish knowledge based systems and verify numerical statements using induction 3: solve different type of enumeration and apply to real life problems CO4: find the shortest path & the chromatic number |
| | | | algorithms related to various types of graphs, trees and applications to real life problems | of a given graph and solve Konigsberg's seven bridge problem using Euler graphs |
| | | | 1.To understand the basic concepts of programming paradigms and java programming. | Upon completion of this course, the student will be able to |
| | | | 2.To know the concepts of classes, methods and strings. | Upon completion of this course, the student will be able to 1. Distinguish various programming paradigms and implement java fundamental programs. 2. Implement classes, constructors, and strings. 3. Apply reusability concepts like inheritance, dynamic method dispatch, and interfaces |
| MSC | MSCCS1 | OOPS THROUGH JAVA | 3. To learn different types of inheritance, interfaces. | |
| I-I | 12 | | 4. To understand the concepts of packages, streams (I/O) , exceptional handling and | 3. Apply reusability concepts like inheritance, dynamic method dispatch, and interfaces. |
| | | | multithreading. | 4. Implement packages, apply streams (I/O), exception handling, and multithreading. |
| | | | 5.To understand Applet Programming and Swings | 5. Implement Applets, AWT and Swings. |
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| | | | | Upon completion of this course, the student will be able to |
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| | | | 1. To make aware of different types of Operating System and their services. | 1. Understand the objectives of operating system and services. |
| | | | 2. To learn different process scheduling algorithms and process scheduling. | 2. Understand the CPU Scheduling and process scheduling. |
| MSC I-I | MSCCS1 | OPERATING SYSTEM | 3. To understand process synchronization and | 3. Synchronizes the processes and deadlocks. |
| •• | 10 | | deadlocks. | 4. Manages the virtual memory and storage techniques. |
| | | | 4. To know storage memory management and virtual memory concepts. | 5. Implement the file system, mass storage structure and protection. |
| | | | 5. To learn file system implementation, mass storage structure and protection. | |
| | | | 1. To familiar with Computer network architecture and OSI and TCP/IP reference | Upon completion of this course, the student will be able to |
| | | | models | 1 Demonstrate computer network architecture, OSI and TCP/IP reference models. |
| MSC | MSCCS1 | COMPUTER | 2. To know different types of data link and medium access control protocols | 2. Determine types of data link and medium access control protocols. |
| 1-1 | 14 | NETWORKS | 3.To understand routing algorithms and internet | |
| | | | working. | 3. Use Routing algorithms and internet working. |
| | | | 4 To understand Transport layer protocols | 4. Design network different protocols used at transport layer. |
| | | | 5. To understand different application layer protocols,Network security algorithms | 5. Design application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN and also design network layer. |
| | | | 1. To understand the basic concepts of java | Upon completion of this course, the student will be able to |
| | | OBJECT ORIENTED | programming and to find the difference from | 1. Distinguish various programming paradigms and |
| MSC I-I | MSCCS1 | PROGRAMMING | procedural programming approach to object | implement java fundamental programs. |
| 1-1 | | THROUGH JAVA LABORATORY | To build fundamental java programs related | 2. Implement classes, constructors, and strings. |
| | | | to classes, methods and strings. | 3. Construct reusability concepts like inheritance, dynamic |

| | | | 3. To familiar with designing java programs effectively with the help of inheritance and interfaces concepts. 4. To study packages, I/O, exceptional handling and multithread programming using java. 5. To learn Applet programming and AWT. | method dispatch, and interfaces. 4. Implement packages, apply streams (I/O), exception handling, and multithreading. 5. Develop web based applications using Applets, AWT and Swings. |
|------------|--------------|-------------------------------------|---|---|
| | | | 5. To fourn reprict programming and rever | |
| | | | | Upon completion of this course, the student will be able to |
| | MSCCS1 16 | OPERATING SYSTEMS LABORATORY | 1. To Analyze the working of an operating system, its programming interface and file system. | 1. Recognize the importance of various categories of UNIX commands. |
| MSC I-I | | | 2. To learn & develop algorithms for process scheduling, memory management. | 2. Apply shell programming concepts for developing applications |
| | | | 3. To understand page replacement algorithms4. To learn disk scheduling | 3. Implement different scheduling algorithms and compare their performance and apply the Banker's algorithm solving the deadlock avoidance problem. |
| | | | 5. To understand file access methods, allocation methods and access matrix. | 4. Implement different scheduling algorithm and compare their performance and apply the Banker's for solving the deadlock avoidance problem. |
| | | | | 5. Implement disk scheduling algorithm. |
| MSC I-I | MSCCS1 17 | COMPUTER NETWORK S LABORATORY | To familiar with Computer network architecture and OSI and TCP/IP reference models To know different types of data link and medium access control protocols To understand routing algorithms and internet | 1 Demonstrate computer network architecture, OSI and TCP/IP reference models. 2. Determine types of data link and medium access control protocols. |

| | | | working. | 3. Use Routing algorithms and internet working. |
|-------------|--------------|--------------------------|--|--|
| | | | 4 To understand Transport layer protocols | 4. Design network different protocols used at transport layer. |
| | | | 5. To understand different application layer protocols,Network security algorithms | 5. Design application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN and also design network layer. |
| | | | This course will develop students" knowledge | Upon completion of this course, students will be able to 1: analyze the technical content and prepare a well- |
| | | | in/on | documented report |
| MSC I-I | MSCCS1 18 | SEMINAR | 1: literature review and report writing 2: presentation skills and speaking with logical sequence & confidence | 2: make effective seminar presentation by exhibiting the presentation skills with confidence in a logical sequence |
| | | | 3: latest and current trends in technologies LO4: | 3: explain the current and upcoming technologies |
| | | | critical thinking | 4: propose and defend opinions and technical ideas with conviction (not as mere recipient of ideas) |
| | | | This course will develop students" knowledge in/on | Upon completion of this course, students will be able to |
| | | | 1: understanding basic operations of computer system, byte addressability in memory location, | 1: analyze functional units of computer and organize instructions for execution |
| | | | addressing modes and instruction formats | 2: describe functionality of control unit and reduce memory access time to fetch instructions from main memory |
| MSC I-II | MSCCS1 21 | COMPUTER ORGANIZATION | unit and memory unit | 3: implement computer arithmetic operations, identify |
| | | | 3: computer arithmetic operations, interface unit for I/O devices communication and various | working procedure of interface unit and various modes of data transfer |
| | | | modes of data transfer | 4: explain polling mechanism in priority interrupts, |
| | | | 4: priority interrupts, computer peripherals, pipelining and superscalar operations | functionality of I/O devices and categorize high performance processors |
| MSC I-II | MSCCS1 22 | ADVANCED JAVA | This course will develop students" knowledge in/on | Course Learning Outcomes (CO): Upon completion of this course, students will be able to |

| | | | This course will develop students" knowledge in/on | 1: analyze the importance of object oriented programming concepts of Java and develop modular programming using |
|-------------|--------------|----------------------------|---|---|
| | | | 1: basic concepts of Java programming | classes |
| | | | 2: utilizing inheritance, exceptional handling, packages and interfaces | 2: reuse concepts like inheritance, polymorphism, packages and interfaces in application development |
| | | | 3: exposing the concepts of multithreading and | 3: develop multithreading and database access applications |
| | | | Java DataBase Connectivity(JDBC) programming | 4: use Graphical User Interface programming concepts to develop different applications |
| | | | 4: understanding concepts of Graphical User Interface(GUI) programming | |
| | | | | At the end of the course the student shall be able to |
| | | | At the end of the unit the student shall be able to | 1: Identify interfaces and frameworks for developing network applications. |
| | Magaal | | 1. Solve broadcasting and multicasting programs | 2: Solve the socket functions for data communication. |
| SEMI NAR | MSCCS1 23 | UNIX NETWORK PROGRAMING | 2. Analyze the different race conditions in broadcasting programs. | 3: Design TCP echo client server program. |
| | | | 3. Solve Simple Network Time Protocol programs | 4: Develop UDP Client Server programs using socket functions. |
| | | | | 5: Analyze the difference between broadcast and multicast programs. |
| | | | 1.To familiar with fundamental concepts of software and the different types of software | After successful completion of course the student should be able to |
| MSC | MSCCS1 | SOFTWARE | models | 1. Learn the concepts of software development life cycle models |
| I-II | 24 | ENGINEERING | 2. To identify correct and robust software | noucls. |
| | | | products by gathering requirements. | 2. Develop correct and robust software products by gathering |
| | | | 3. To design architectural design and user | requirements. |
| | | | interface design. | 3. Create an architectural design and user interface design. |

| | | | 4. To gain the knowledge of Software testing techniques and strategies and analyzing the appropriate test methods for given software 5. To understand different metrics for different software and analyze the quality of a software | 4. Identify different Software testing techniques and strategies also Manages and maintains Software Project to ensure good quality software with high reliability. 5. Analyse various metrics for estimation of software products also analyses risk management and quality management. |
|-------------|--------------|--------------------------------|---|--|
| MSC I-II | MSCCS1 25 | ADVANCED JAVA LAB | To learn the Internet Programming, using Java Applets To create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings To understand event handling on AWT and Swing components. To learn to access database through Java programs, using Java Data Base Connectivity (JDBC) To create dynamic web pages, using Servlets and JSP. | After the completion of the course, the student will be able to: 1. Learn the Internet Programming, using Java Applets 2. Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings 3. Apply event handling on AWT and Swing components. 4. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC) 5. Create dynamic web pages, using Servlets and JSP. |
| MSC I-II | MSCCS1 26 | | | |
| MSC I-II | MSCCS1 27 | SOFTWARE ENGINEERING LAB | To provide the idea of decomposing the given problem into Analysis, Desing, Implementation, Testing and Maintenance phases. To provide an idea of using various process models in the software industry according to given circumstances. | Upon completion of this course, students will be able to 1. Decompose the given project in various phases of a lifecycle. 2 Choose appropriate process model depending on the user requirements. |

| | | | 3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a | 3 Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance. Evaluate 4 Know various processes used in all the phases of the |
|-------------|--------------|---|---|---|
| | | | software project. | 5 Apply the knowledge, techniques, and skills in the development of a software product. |
| MSC I-II | MSCCS1 28 | SEMINAR | This course will develop students" knowledge in/on 1: literature review and report writing 2: presentation skills and speaking with logical sequence & confidence 3: latest and current trends in technologies 4: critical thinking | Upon completion of this course, students will be able to 1: analyze the technical content and prepare a well- documented report 2: make effective seminar presentation by exhibiting the presentation skills with confidence in a logical sequence 3: explain the current and upcoming technologies 4: propose and defend opinions and technical ideas with conviction (not as mere recipient of ideas) |
| MSC II-I | MSCCS2 11 | AUTOMATA THEORY AND FINITE LANGUAGES | To familiar with basic mathematical concepts Construction of finite state machines DFA,NFA and its equivalence. To design Moore and Melay machines and study regular grammar, and know given language is regular or not To understand the concepts of Regular language, Context free Language and simplification. To gt the knowledge of Designing pushdown automata and normal Forms To study Designing Turing machines, decidability and undecidability of problems | After completing this course, the student will be able to: 1. Design finite state automata DFA and NFA and its equivalence. 2. Design Moore Melay machines, Regular grammar, regularexpression & representations for regular languages. 3. classify formal languages into regular, context-free, contextsensitive and unrestricted language 4. Design push-down automata and context-free grammar representations for context-free languages. 5. Design Turing Machines for accepting recursively enumerable languages and Notions of decidability and undecidability of problems, |

| | | | | After successful completion of course the student should be able to |
|-------------|--------------|-----------------------|---|--|
| | | | 1.To introduce concepts and techniques of Data Mining. | 1. Familiarize with various types of machine learning algorithms and solve it. |
| MSC | MSCCS2 | DATA WAREHOUSING | 2.To become familiar with regression methods, classification methods. | 2. Articulate how these algorithms are fundamentally different from traditional programming algorithms. |
| II-I | 12 | AND MINING | 3.To become familiar with techniques such as decision tree learning, Bayesian learning etc. | 3. Practice the Bayesian and computational algorithms related to the real time application. |
| | | | 4.To understand computational learning theory.5.To study the pattern comparison techniques | 4. Implement the effective of analytical concepts, inductive analytical approaches and reinforced learning algorithms. |
| | | | | 5. Construct various instant based learning and learning set of rules. |
| | | | | After completing this course, the student will be able to: |
| | | | 1.To learn handling of variables and performing arithmetic, logical and relational operations. | 1. Handle different Data types and operation on them. |
| MSC II-I | | PYTHON PROGRAMMING | 2.To learn control structures and developing user defined functions. | 2. Apply the control structures and function whenever required in programs. |
| | MSCCS2 13 | | 3.To understand how to handle the various data structures like List, Tuple Set and Dictionaries. | 3. Use various data structures like List, Tuple, Set and Dictionaries at appropriate place. |
| | | | 4. To learn how to handle strings, files and develop modules | 4. Develop application requires file handling. |
| | | | 5.To learn how to handle python object oriented programming and creating GUI | 5. Develop GUI applications and use the object oriented features. |

| | | | The basics of statistical computing and data | After competing this course, you will be able to: |
|-----------|--------|------------------------|--|--|
| | | | analysis | The competing this course, you will be use to: |
| | | | unury 515 | 1 Explain critical R programming concepts |
| MSC | | | 1.How to use R for analytical programming | TEXPlain entited it programming concepts |
| | | | 2.How to implement data structure in R | 2.Demonstrate how to install and configure RStudio |
| | MSCCS2 | PROGRAMMING | 3.R loop functions and debugging tools | 3.Apply OOP concepts in R programming |
| II-I | 14 | WITH R | 4.Object-oriented programming concepts in R | 4.Explain the use of data structure and loop functions |
| | | | 5.Data visualization in R | 5 Analysis data and assesses supports based on the data |
| | | | 6 How to perform error handling | 5. Analyse data and generate reports based on the data |
| | | | 0.110w to perform error nandning | 6 Apply various concepts to write programs in P |
| | | | 7.Writing custom R functions | 0. Apply various concepts to write programs in K |
| | | | | |
| | | | | |
| | | | | After successful completion of course the student should be able to |
| | | | | |
| | | | 1.To introduce concepts and techniques of Data | 1. Familiarize with various types of machine learning |
| | | | Mining. | algorithms and solve it. |
| | | | 2 To become familier with represent motheds | 2 Articulate how these algorithms are fundamentally |
| | | S2 DATA WAREHOUSING | 2.10 become familiar with regression methods, | 2. Articulate now these algorithms are fundamentally different from traditional programming algorithms |
| MSC MSCCS | MSCCS2 | | classification methods. | different from tradicional programming algorithms. |
| II-I | 15 | AND MINING LAB | 3.To become familiar with techniques such as | 3. Practice the Bayesian and computational algorithms related |
| | | | decision tree learning, Bayesian learning etc. | to the real time application. |
| | | | 4 To understand computational learning theory | 4. Implement the effective of enclytical concents, inductive |
| | | | 5. To study the pattern comparison techniques | analytical approaches and reinforced learning algorithms |
| | | | | anarytical approactics and remnitoreed rearining algorithms. |
| | | | | 5. Construct various instant based learning and learning set of |
| | | | | rules. |
| | | | 1 To learn writing simple programs involves | After completing this course, the student will be able to: |
| MSC | MSCCS2 | ΡΥΤΗΟΝΙΑΡ | usage of different data types and its operations | 1 Develop ano groups handling services of data torong |
| II-I | 16 | | usage of unreferre data types and itsoperations. | 1. Develop programs handling verity of data types. |
| 1 | 1 | | 2 To loom writing measure required to use | |

| MSC II-I | MSCCS2 17 | PROGRAMMING WITH R LAB | control structures and function 3. To learn writing programs using all types' data structures. 4. To learn implementing object oriented features and developing simple GUI applications The basics of statistical computing and data analysis 1. How to use R for analytical programming 2. How to implement data structure in R 3. R loop functions and debugging tools 4. Object-oriented programming concepts in R 5. Data visualization in R 6. How to perform error handling 7. Writing custom R functions | Develop application involving searching, sorting and ranking of different data. Develop programs handling of strings Develop application involving file processing. Develop simple GUI Interfaces. After competing this course, you will be able to: Explain critical R programming concepts Demonstrate how to install and configure RStudio Apply OOP concepts in R programming Explain the use of data structure and loop functions Analyse data and generate reports based on the data Apply various concepts to write programs in R |
|-------------|--------------|---------------------------|---|--|
| MSC II-I | MSCCS2 18 | SEMINAR | This course will develop students" knowledge in/on 1: literature review and report writing 2: presentation skills and speaking with logical sequence & confidence 3: latest and current trends in technologies 4: critical thinking | Upon completion of this course, students will be able to 1: analyze the technical content and prepare a well- documented report 2: make effective seminar presentation by exhibiting the presentation skills with confidence in a logical sequence 3: explain the current and upcoming technologies 4: propose and defend opinions and technical ideas with conviction (not as mere recipient of ideas) |

| | | | | Upon completion of the course, the students will be able to: |
|--------------|--------------|---|--|---|
| Mag | | | 1.To understand the importance of the field of AI by discussing its history and various Application domains of AI. | 1. Analyze and represent the problem suitable for specific search method. |
| | | | 2.To gain the knowledge of types of search strategies used in AI and representing problems in state spacesearch. | 2. Select suitable state space search strategy in order to solve given problem. |
| II-II | 21 21 | INTELLIGENCE | 3.To Learn some standard search strategies and Understanding methods to representknowledge. | 3. Represents the knowledge available in the problem in various forms. |
| | | | 4.To Learn how to perform reasoning based on the available knowledge of the problem. | 4. Answer the questions related to problems using reasoning.5. Identify explore further scope of AI in gaming and NLP applications. |
| | | | 5.To know the concepts of game playing, planning and NLP | |
| | MSCCS2 22 | CRYPTOGRAPHY & INFORMATION SECURITY | 1.To know about various encryption techniques. | After successful completion of the course the students should be able to |
| | | | 2.To understand the concept of Public key cryptography. | Identify the security issues in the network and resolve it. Analyse the vulnerabilities in any computing system and hence be able to design a security solution. |
| MSC II-II | | | 3.To study about message authentication and hash functions | 3. Evaluate security mechanisms using rigorous approaches by key ciphers and Hash functions. |
| | | | 4.To impart knowledge on Network security applications, about IPSec, Email Security. | 4. Demonstrate various network security applications, IPSec, and Email Security |
| | | | and Malicious software etc., | 5.Firewall, IDS, Web Security, and Malicious software etc., |
| MSC | MSCCS2 | CLOUD | 1. Basic concepts of cloud, Features of cloud and computing environments | After successful Completion of course the students should be able to : |
| II-II | 23 | COMPUTING | 2. Principles of Parallel and Distributed Cloud Computing and virtualization techniques | 1. Reviews the basic concepts of cloud ,Features of cloud and computing environments |

| | | | 3. To analyse Cloud Architecture & Cloud Deployment Models | 2. Analyzes the Principles of Parallel and Distributed Cloud Computing and virtualization techniques |
|--------------|--------------|-----------------------|---|--|
| | | | 4. To study Importance of security and federated cloud | 3. Evaluate the Cloud Architecture & Cloud Deployment Models. |
| | | | 5. Cloud platforms and real time applications | 4. Categorize the Importance of security and federated cloud. |
| | | | used in industry | 5. Interprets Cloud platforms and real time applications used in industry. |
| | | | | After successful completion of course the student should be able to |
| | | | 1: problem based and project based learning | 1: demonstrate creativity in the design of components, systems or processes of their program of study |
| MSC II-II | MSCCS2 24 | MAJOR PROJECT | 2: major project design in one of the selected areas of specialization with substantial multidisciplinary component | 2: design an innovative product by applying current knowledge and adopt to emerging applications of engineering & technology |
| | | | 3: analytical and research skills4: team work, leadership and interpersonal skills | 3: work cooperatively with others to achieve shared goal by motivating team-mates with a clear sense of direction, values and ethics, |
| | | | | 4: write concisely & convey meaning in a manner appropriate to different readers and verbally express ideas easily understood by others who are unfamiliar with the topic |
| | | | To acquire knowledge and skills to face the interview panel. | 1.Students should be able to demonstrate the application of the knowledge acquired in the fours semesters to solve the problems of the various forms of organisations/instituions. |
| MSC II-II | MSCCS2 25 | COMPHEHENSIVE VIVA | 1. To Equip the students with analytical and evaluation abilities to to respond | 2. Understand the practical difficulties in applying the various forms of solutions to find the |
| | | | 2. to impromptu questions by the panel members. | 3. feasible solution. Solve the real life problems and assess the implications of various forms of solutions |
| | | | 3.To make the students to face the expert panel | |

| | | | and present the knowledge, skills and4. problems in the most efficient way. | 4. Students should be able to make effective presentation of different topics learnt before the expert problem. |
|--------------|--|---------|--|---|
| MSC II-II | | SEMINAR | This course will develop students" knowledge in/on 1: literature review and report writing 2: presentation skills and speaking with logical | Upon completion of this course, students will be able to 1: analyze the technical content and prepare a well-documented report 2: make effective seminar presentation by exhibiting the presentation skills with confidence in a logical sequence |
| | | | 3: latest and current trends in technologies | 3: explain the current and upcoming technologies |
| | | | 4: critical thinking | 4: propose and defend opinions and technical ideas with conviction (not as mere recipient of ideas) |