GovernmentArtsCollege for Men (Autonomous)
Nandanam, Chennai - 600035
Department of Computer Science

GOVERNMENTARTS COLLEGE
(Autonomous)
NANDANAM, CHENNAI – 600 035

M.Sc. DEGREE COURSE IN COMPUTER SCIENCE

(SEMESTER SYSTEM WITH CHOICE-BASED CREDIT SYSTEM)
(effect from the Academic Year **2019 - 2020** and afterwards)

PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES, COURSE OUTCOMES

Mechanism of Communication:

As per the UGC regulation and Accreditation learning outcomes of the Programs and Courses is stated below. The following mechanism is followed by the department to communicate the learning outcomes to the teachers and students.

- Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students
- Learning Outcomes of the Programs and Courses are displayed in the department
- Soft Copy of Curriculum and Learning Outcomes of Programs and Courses are also available in online for reference
- The importance of the learning outcomes has been communicated to the teachers in every IQAC Meeting and College Committee Meeting.
- The students are also made aware of the same through Tutorial Meetings.

Department of Computer Science	
Programme Outcome	An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs. An ability to function effectively on teams to accomplish a common goal. An understanding of professional, ethical, legal, security and social issues and responsibilities. An ability to communicate effectively with a wide range of audiences. An ability to analyze the local and global impact of computing on individuals, organizations, and society. Recognition of the need for and an ability to engage in continuing professional development. An ability to use current techniques, skills, and tools necessary for computing practice. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. An ability to apply design and development principles in the construction of software systems of varying complexity.

Programme Specific Outcome	Ability to apply the knowledge gained during the course of the program from Mathematics, Basic Computing, Basic Sciences and Social Sciences in general and all computer science courses in particular to identify, formulate and solve real life complex engineering problems faced in industries and/or during research work with due consideration for the public health and safety, in the context of cultural, societal, and environmental situations. Ability to provide socially acceptable technical solutions to complex computer science engineering problems with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice. Ability to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team. Ability to comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

Course Outcomes

Course	Outcomes
Real -Time Java Programming	✓ To inculcate knowledge on Java Programming concepts .On successful completion of the course the students should have acquired skill in advanced java programming.
Mathematical Structure for Computer Science	✓ Ability to apply mathematical logic to solve problems ✓ Understand sets, relations, functions and discrete structures ✓ Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions ✓ Able to formulate problems and solve recurrence relationsAble to model and solve real world problems using graphs and trees
Real - Time Java Programming –Lab	✓ learn the Internet Programming, using Java Applets ✓ 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 ✓ apply event handling on AWT and Swing components. ✓ learn to access database through Java programs, using Java Data Base Connectivity (JDBC) ✓ create dynamic web pages, using Servlets and JSP. ✓ make a resusable software component, using Java Bean. ✓ invoke the remote methods in an application using Remote Method Invocation (RMI) ✓ understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB). ✓ develop Stateful, Stateless and Entity Beans. ✓ use Struts frameworks, which gives the opportunity to reuse the codes for quick development. 11.map Java classes and object associations to relational database tables with Hibernatemapping files

IOT and its Application	✓ AbletounderstandtheapplicationareasofIOT ✓ AbletorealizetherevolutionofInternetinMobileDevices,Cloud&SensorNetworks ✓ AbletounderstandbuildingblocksofInternetofThingsandcharacteristics
Elective-1 Data warehousing and Data Mining	✓ On Successful completion of the course the students should have understood the Association rules, Clustering techniques and Data warehousing
Information Security Management	✓ On Successful completion of the course the students should have understood the process of implementing the cryptographic algorithms.
Software Project Management	✓ On successful completion of the course the students should have a deep insight to software project management concepts
Decision Support System	✓ Recognize the relationship between business information needs and decision making ✓ Appraise the general nature and range of decision support systems ✓ Appraise issues related to the development of DSS ✓ Select appropriate modelling techniques ✓ Analyse, design and implement a DSS
Design and Analysis of Algorithms	✓ Ability to Understand, Analyze the performance of recursive and non recursive algorithms and use of asymptotic notations to measure the performance of algorithms. ✓ To prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains. ✓ Able to develop any new application with the help of data structures and algorithms. ✓ Ability to design the algorithm using greedy method ✓ Ability to develop applications using the concept of Dynamic programming ✓ Ability to develop gaming applications using backtracking. ✓ Apply branch and bound to Travelling sales person problem, 0/1 knapsack problem. ✓ To design algorithms using the Branch and Bound strategy, and recite algorithms that employs this strategy ✓ To compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that NP, NP-complete, and NP-hard. ✓ To synthesize efficient algorithms in common engineering design situations.
Design and Analysis of Algorithms Lab	✓ Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.) ✓ Implement a variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language. ✓ Analyze and compare the performance of algorithms using language features ✓ Apply and implement learned algorithm design techniques and

	data structures to solve real world problems
Internet and its Application	✓ Understand the basic concepts and the usage of internets, mail creation, online job apply, resume preparation, social networks etc.
E-Commerce	✓ On Successful Completion of this subject the students should have: - E-Commerce , E-Market , EDI , Business Strategies etc.,
Shell Programming	✓ This course will prepare students to develop software in and for Linux environments. It include basic operating system concepts, effective command line usage, shell programming, the C language, programming development tools, system programming, network programming (client- server model and sockets), and GUI programming
Digital Image Processing	✓ To clear digital image fundamentals. ✓ To know the elements of visual perception, sampling and quantization. ✓ To understand the Fourier Transform for Image transformation. To clarify two dimensional Fourier transforms. ✓ To enhance the image by spatial domain and frequency domain method. ✓ To know the types of filters to enhance the image. ✓ To understand circulant matrices and Block Circulant matrices. ✓ To clear the Effects of Diagonalization on the Degradation Model. ✓ To illuminate image compression models. ✓ To understand fundamental coding theorems.
Artificial Intelligence and Expert System	✓ Basic Knowledge about the concepts of Artificial Intelligence Production systems. ✓ Design and implement appropriate AI solution techniques for such problems. ✓ Ability to apply knowledge representation, reasoning, and machine learning techniques to real world problems. ✓ To Understand the Hill Climbing concepts and Best-First Search. ✓ Ability to learn Predicate logic and Representing Instance and relationships. ✓ To know the concept of Forward and Backward Reasoning. ✓ Introduction to Non Monotonic Reasoning and statistical reasoning. ✓ Implement appropriate learning algorithms such as decision trees, support vector machines, and boosting. ✓ To learn the concept of Neural Networks and Expert Systems ✓ To impart the basic idea about Knowledge acquisition.
Machine Learning	✓ Approach to thinking about machine learning problems. ✓ Methods, and discuss how different methods relate to one another and will be able to develop new and appropriate machine learning methods appropriate for particular problems.

	✓ The core techniques and methods needed to use machine learning in any area.
Machine Learning Lab	✓ Implementation of machine learning problems using tools ✓ Implementation Different methods relate to one another, new and appropriate machine learning methods for particular problems.
Modern Operating System	✓ Enable the students to get sufficient knowledge on various system resources, system software and Operating system concepts.
Internet Technologies	✓ Learn basic principles of using Windows operation system. ✓ Learn and practice basic keyboarding and mouse use. ✓ Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses. ✓ Be able to find and evaluate information on the Web ✓ Learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books. ✓ Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts. ✓ In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.
E-Learning	✓ To learn e learning concept and its need on business organization, implementation of Digitization in administrative environment. ✓ Understanding various productive tools and its implementation
Multimedia and its Application	✓ Work with learners to create a project plan based on a client brief and to undertake audience and competitor research ✓ Work with learners to build a website with images, text, audio and video ✓ Recognize and assess the functional skills demonstrated by learners as they complete tasks and activities in the multimedia unit. ✓ Execute the operation of equipment and/or procedures associated with multiple facets of multimedia. These may include: digital-photography, page layout, typography, video, audio, interactive media, and web design. ✓ Gain experience with multimedia processes using current, recognized, industry-standard software as well as computer hardware and software associated in both Mac and Windows platforms. ✓ Demonstrate an advanced knowledge of photo editing including: image manipulation, color correction, compositing, toning, and preparing for distribution. ✓ Assemble video projects in professional non-linear editing

	software showing proficiency in importing, exporting, effects, transitions, color correcting, and flow. ✓ Demonstrate proper knowledge of recording, editing and producing on-air audio content for professional use. ✓ Students will be aware of the rapid rate of change of technology and methodologies in the multimedia environment. ✓ Students will be familiar with techniques and resources in order to obtain knowledge and understanding of new developments in multimedia technology.
Big Data Analytics	✓ On successful completion of the course the students should have understood the big data handling concepts, R Programming, Map Reduceand Hadoop based analytics, Understood the HDFS architecture
Social Computing	✓ Understand the range of social computing applications and concepts. ✓ Understand and apply concepts of computational models underlying social computing ✓ Carry out simple forms of social analytics, involving network and language models, applying existing analytic tools on social information. ✓ Design and launch social computing applications. ✓ Understand the broad aspects of, and implement, richer social computing models in social computing applications. ✓ Evaluate emerging social computing applications, concepts, and techniques in terms of key principles.
Wireless Network	✓ Learn the Concepts, Network Architecture and Applications of Ad-hoc and Wireless Sensor Networks. ✓ Analyze the protocol design issues of Ad-hoc Networks. ✓ Know the design of routing protocols for ad-hoc and wireless networks. ✓ Learn the Concepts, Architecture of ad-hoc and sensor networks and MAC layer protocols. ✓ Evaluate the QOS related performance measurements of ad-hoc and sensor network
Distributed Database Management System	✓ To learn the basic concepts of DBMS ✓ To Know the concepts of SQL ✓ To understand PL/SQL, Triggers and cursors ✓ To know the concept of Normalization ✓ Define the terminology, features, classifications, and characteristics embodied in database systems. ✓ Master the basics of query evaluation techniques and query optimization. ✓ Master the basics of SQL and construct queries using SQL. ✓ Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

	✓ Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
Data Science	✓ Obtain, clean/process and transform data. ✓ Analyze and interpret data using an ethically responsible approach. ✓ Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues. ✓ Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses. ✓ Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenges. ✓ Perform well in a group. ✓ Interpret data findings effectively to any audience, orally, visually and in written formats.
Data Science Lab	✓ Exploratory data analysis (EDA), analyzing data sets to summarize their main characteristics with visual methods ✓ Demonstrate of various Mathematical Functions using data analytical tools ✓ Integration and Optimization using data analytical Package ✓ Perform Data Visualization through Python
Soft Computing	✓ To understand Artificial Neuron and Neural Network Architecture. ✓ To clear the various concepts of learning techniques. ✓ To explain the concepts of Back Propagation Networks. ✓ To understand the back propagation algorithm. ✓ To know the concepts of Fuzzy logic. ✓ To understand Fuzzy and crisp relations and conversions. ✓ To know the fuzzy membership and rules. ✓ To understand Fuzzyfication and Defuzzyfication ✓ To clarify working principles of genetic algorithm. ✓ To understand the concepts of genetic operators.
Mobile Application Development	✓ develop high-level plans for script solutions for mobile and evaluate the post-production outcome; ✓ design scripts to meet given interface and media control requirements; ✓ use variables, properties and other code elements appropriately to implement the code design; ✓ devise, carry out and evaluate functional test strategies of mobile design; ✓ implement and evaluate techniques for the installation of mobile applications and delivery via various channels; ✓ explain the principles of technologies which support media production and delivery on a variety of platforms.

Parallel Computing	✓ Analyse the requirements for programming parallel systems and critically evaluate the strengths and weaknesses of parallel programming models and how they can be used to facilitate the programming of concurrent systems. ✓ Discuss the difference between the major classes of parallel processing systems and design software solutions for a number of parallel processing models. ✓ Design and implement a SIMD and MIMD parallel processing solution. ✓ Analyse the efficiency of a parallel processing system and evaluate the types of application for which parallel programming is useful.
Artificial Neural Networks	✓ To Understand the basic concept of Neural Networks, Inference and Learning. ✓ To know the models such as Classification Models, Association Models, Optimization Models, and Self-Organization Models. To explain the difference between supervised and unsupervised learning. ✓ To impart the knowledge about Types of Neural Networks. ✓ To understand the Incremental learning concepts ✓ To clear the knowledge based Approaches in Incremental learning. ✓ To clarify various models in Heuristics. ✓ To be well versed in Symbolic Methods and NN Methods. ✓ To clear the concepts of Structures, Sequences and Spatio-temporal Neural Networks. ✓ Learning Procedures Knowledge based Approaches
Theory of Computation	✓ Understand, design, construct, analyze and interpret Regular languages, Expression and Grammars. ✓ Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator. ✓ Understand, design, analyze and interpret Context Free languages, Expression and Grammars. ✓ Design different types of Push down Automata as Simple Parser. ✓ Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machine.
Software Testing	✓ To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. ✓ Have an ability to apply software testing knowledge and engineering methods. ✓ To apply a wide variety of testing techniques in an effective and efficient manner. ✓ Have an ability to design and conduct a software test process for a software testing project. ✓ Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects. ✓ Have an ability to use software testing methods and modern software testing tools for their testing projects. ✓ Have an ability understand and identify various software testing

	problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. ✓ Able to conduct tests at various levels to check the flow of data and control, and to check the code after integrating. ✓ Able to understand quality of software at thread levels by identifying faults. ✓ Able to plan and monitor the development of software systematically using software specification and design document
Project Work	✓ The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.