

Ramakrishna Mission Vivekananda Centenary College
Rahara, Kolkata-700118

DEPARTMENT OF COMPUTER SCIENCE

Programme Outcomes, Programme Specific Outcomes,
Course Objectives and Course Outcomes of the **B.Sc.**

(Hons.) Computer Science Syllabus

Session 2018-2021



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Principal
Ramakrishna Mission
Vivekananda Centenary College
Rahara, Kolkata-700 118

Programme Outcome:

After completion of the B.Sc. Degree program, the students will be able to:

PO No.	Programme Outcomes	Cognitive Level
PO 1	Recognize the scientific tempers and attitudes, which in turn can prove to be beneficial for the society since the scientific developments can make a nation or society to grow at a rapid pace.	R
PO 2	Understand scientific knowledge and exchange ideas with other stakeholders; make people aware about sustainable utilization of resources with ethical approach.	U
PO 3	Understand and apply the issues of environmental contexts and sustainable development as a basic interdisciplinary concern.	U, Ap
PO 4	Create the ability to perform experiments and to analyse & interpret the obtained accurate results and thus gain the ability to solve problems, to involve in critical, independent, and creative thinking.	An, E, C
PO 5	Possess expertise to apply and formulate ideas which will provide them competitive advantage in pursuing higher studies from India or abroad; and seek jobs in academia, research or industries.	Ap, E
PO 6	Assemble the acquired in-depth knowledge of applied subjects towards the inculcation of professional and employment skills so that students can make a career and become an entrepreneur in diverse fields.	C

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

Programme Specific Outcomes:

After the successful completion of this course, the student will be able to:

PSO No.	Programme Specific Outcomes	Cognitive Level
PSO1	The ability to define and illustrate the concepts of algorithms, data structures/management, software design, concepts of programming languages and computer organization & architecture.	R(1), U(2)
PSO2	Demonstrate the capability to work with and communicate effectively with professionals in various fields and pursue lifelong professional development in computing.	U(2), Ap(3)
PSO3	Use the learned concepts to analyse problems in computational domain and design viable prototypes.	Ap(3), An(4), C(6)
PSO4	Ability to analyse and explain standard software engineering principles to develop efficient solutions for emerging software related challenges in the computation domain.	An(4), E(5), C(6)
PSO5	Develop their skills to solve problems in the broad area of programming concepts and appraise environmental and social issues with ethics and manage different projects in inter-disciplinary field.	E(5), C(6)
PSO6	Ability to interpret, design, develop, implement computer programs and use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.	E(5), C(6)

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Semester-wise syllabus

Core Courses:

SEMESTER-I
Name of the course: Programming Fundamentals using C/C++
Course code: UGCMSCC01

Course Objectives:

1. Knowledge and capability to find computational solution of different problems.
2. Capability to construct algorithm of problems.
3. Understanding the C/C++ programming language.
4. Knowledge of basic programming aspects such as loop, function, array, structure, class, objects, etc.

Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Discuss, memorize and understand the different concept of C/C++ programming constructs and classes for code reuse.	R(1), U(2)	PO2	PSO1
CO2	Solve problems and propose algorithms, pseudo codes and flowcharts for it.	Ap(3)	PO4	PSO3 PSO4
CO3	Identify real life problems and convert it to computational problems.	Ap(3)	PO3	PSO2 PSO3
CO4	Apply the concepts of structural and object oriented programming such as loops, functions, structure, class, inheritance, friend functions, and virtual functions to develop programs for problem solving.	Ap(3), C(6)	PO3	PSO3
CO5	Analyse and Compare approaches to model efficient and standard programs.	An(4)	PO4 PO5	PSO4
CO6	Evaluate, design, compile, run and debug programs for software development.	E(5)	PO4 PO5	PSO5 PSO6

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SEMESTER-I
Name of the course: Computer System Architecture
Course code: UGCMSCC02

Course Objectives:

1. Knowledge of basic architectural organization and design of computer.
2. Capability to understand the concept of arithmetic and logic unit, pipelining with hierarchical memory system including cache memories and virtual memory.



Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define the basic architectural organization and design of computer.	R(1)	PO1	PSO1
CO2	Ability to understand the basic structure, operation and characteristics of digital computer.	U(2)	PO2	PSO1 PSO2
CO3	Ability to understand the arithmetic and logic unit as well as the concept of pipelining with hierarchical memory system including cache memories and virtual memory.	U(2)	PO2 PO3	PSO1 PSO2
CO4	Distinguish between different ways of communicating with I/O devices and standard I/O interfaces	An(4)	PO5	PSO4 PSO6

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SEMESTER-II

Name of the course: **Programming in Java**

Course code: **UGCMSCC03**

Course Objectives:

1. Knowledge of different concept of Java programming such as classes, code reusability, loops, functions, inheritance, package, interface, multithreading, etc.
2. Capability to design and reuse codes with the aid of object oriented programming.
3. Capability to develop real life problem solving applications.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Discuss, memorize and understand the different concept of Java programming constructs and classes for code reuse.	R(1), U(2)	PO2	PSO1
CO2	Identify real life problems and convert it to computational problems.	Ap(3)	PO6	PSO5 PSO6
CO3	Analyse the concepts of object oriented programming such as loops, functions, class, inheritance, packages, multi-threading and abstract class to develop programs for problem solving.	Ap(3), An(4)	PO3	PSO2 PSO3
CO4	Analyse and Compare approaches to model efficient and standard programs for real life application development.	An(4), E(5)	PO3	PSO3
CO5	Evaluate, design, compile, run and debug programs for software development.	E(5), C(6)	PO4 PO5	PSO4

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SEMESTER- II
Name of the course: Discrete Structures Theory
Course code: UGCMSCC04

Course Objectives:

1. Knowledge of the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, graphs and related discrete structures.
2. Capability to apply the knowledge for computational problem solving of real life problem.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define and understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking.	R(1), U(2)	PO1 PO2	PSO1 PSO2
CO2	Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.	R(1), U(2)	PO2	PSO1 PSO2
CO3	Understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving	U(2), Ap(3)	PO2	PSO2 PSO3
CO4	Understand asymptotic notation, its significance, and be able to use it to analyse asymptotic performance for some basic algorithmic examples	U(2), An(4)	PO4	PSO3 PSO4
CO5	Ability to determine effective algebraic techniques to analyse basic discrete structures and algorithms and be able to apply them in problem solving.	An(4), E(5), C(6)	PO4	PSO4 PSO6

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SEMESTER- III
Name of the course: Data Structures
Course code: UGCMSCC05

Course Objectives:

1. Knowledge of fundamental data structures like: array, linked list, stack, queue, tree , graph, etc.
2. Capability to apply the knowledge for choosing a data structure to suitably model any data used in computer applications.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define fundamental data structures and with the manner in which these data structures can best be implemented.	R(1)	PO1	PSO1 PSO2
CO2	Ability to understand the complexity of basic operations like insert, delete, search on these data structures.	U(2)	PO2 PO3	PSO1 PSO2
CO3	Ability to analyse and know the applications of algorithms for sorting, pattern matching etc	An(4)	PO4	PSO3



				PSO4
CO4	Ability to choose a data structure to suitably model any data used in computer applications.	E(5)	PO4	PSO4
CO5	Ability to assess efficiency trade-offs among different data structure implementations.	E(5)	PO5	PSO4 PSO5
CO6	Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc.	C(6)	PO6	PSO6

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SEMESTER- III
Name of the course: Operating Systems
Course code: UGCMSCC06

Course Objectives:

1. Knowledge of the role of operating system in their management policies and algorithms.
2. Knowledge of the design issues, various process management concepts, scheduling, synchronization, and deadlocks associated with operating systems
3. Capability to identify potential threats to operating systems and will have the ability to understand the security features to guard against them.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understanding various functions, structures and history of operating systems and should be able to define objectives of modern operating systems and describe how operating systems have evolved over time.	R(1), U(2)	PO1	PSO1
CO2	Describe the important computer system resources and the role of operating system in their management policies and algorithms.	U(2)	PO2	PSO2 PSO3
CO3	Understanding of design issues, various process management concepts, scheduling, synchronization, and deadlocks associated with operating systems.	U(2)	PO2	PSO2 PSO3
CO4	Understanding about multithreading, concepts of memory management including virtual memory, file system interface and implementation, disk management.	U(2)	PO3	PSO1 PSO2
CO5	Describe the functions of a contemporary operating system with respect to convenience, efficiency, and the ability to adapt to different operating systems.	U(2)	PO2 PO4	PSO1 PSO4
CO6	Ability to categorise and identify potential threats to operating systems and will have the ability to explain the design criteria of the security features to guard against them.	An(4), E(5)	PO4 PO5	PSO4 PSO6

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SEMESTER- III
Name of the course: Computer Networks
Course code: UGCMSCC07

Course Objectives:

1. Knowledge of contemporary issues in network technologies.
2. Knowledge of different network models and their functionalities.
3. Capability to understand design issues of WAN, LAN and wireless networks, its network configuration and maintenance along with the fundamentals of network security.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Familiarize with contemporary issues in network technologies.	R(1)	PO1	PSO1
CO2	Know the layered model approach explained in OSI and TCP/IP network models and Identify different types of network devices and their functions within a network.	R(1)	PO1	PSO1
CO3	Understand the structure of Data Communications System and its components. Be familiarize with different network terminologies	R(1), U(2)	PO2	PSO1 PSO2
CO4	Learn and illustrate the basic routing mechanisms, IP addressing scheme and internetworking concepts	Ap (3)	PO3	PSO3 PSO4
CO5	Able to analyse the IP and TCP Internet protocols.	An(4)	PO4	PSO4
CO6	Ability to understand and determine the major design issues of WAN, LAN and wireless networks, its network configuration and maintenance along with the fundamentals of network security.	E(5)	PO5 PO6	PSO5 PSO6

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SEMESTER- IV
Name of the course: Design and Analysis of Algorithms
Course code: UGCMSCC08

Course Objectives:

1. Understanding of design aspects of different computational algorithms.
2. To gain the capability of estimating cost of devising an algorithm.
3. Capability to apply the knowledge of algorithm design for practical problem solving.



Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define how to analyse algorithms and estimate their worst-case and average-case behaviour.	R(1)	PO1	PSO1
CO2	Ability to understand good principles of algorithm design.	U(2)	PO2	PSO1 PSO2
CO3	Ability to analyse and be accustomed to the description of algorithms in both functional and procedural styles.	An(4)	PO4	PSO4
CO4	Ability to apply their theoretical knowledge in practice and design algorithms for problem solving.	Ap(3), C(6)	PO6	PSO6

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SEMESTER- IV

Name of the course: **Software Engineering**

Course code: **UGCMSCC09**

Course Objectives:

1. Basic knowledge and understanding of design of software development.
2. Understanding of effective time and resource management for real world software development.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define and understand the analysis and design of complex software systems.	R(1), U(2)	PO1 PO2	PSO1 PSO2
CO2	Ability to apply software engineering principles and techniques.	Ap(3)	PO3	PSO2 PSO3
CO3	To manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyses the common threats in each domain.	An(4)	PO4	PSO4 PSO5
CO4	Ability to work as an effective member or leader of software engineering teams.	E(5)	PO5	PSO2 PSO5
CO5	Ability to develop efficient, reliable, robust and cost-effective software solutions.	C(6)	PO6	PSO6

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SEMESTER- IV

Name of the course: **Database Management Systems**

Course code: **UGCMSCC10**



Course Objectives:

1. Gain knowledge of database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems.
2. Be acquainted with the basics of transaction processing and concurrency control and understand the database storage structures and access techniques.
3. Understanding of normalization theory and apply such knowledge to the normalization of a database.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define the database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems	R(1)	PO1	PSO1
CO2	Ability to understand the basics of transaction processing and concurrency control and understand the database storage structures and access techniques.	U(2)	PO2	PSO1 PSO2
CO3	Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.	Ap(3)	PO3	PSO2
CO4	Compare, contrast and analyse the various emerging technologies for database systems.	An(4)	PO4	PSO3 PSO4
CO5	Analyse strengths and weaknesses of the applications of database technologies to various subject areas.	E(5)	PO4	PSO4
CO6	Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model.	C(6)	PO6	PSO6

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SEMESTER- V

Name of the course: **Internet Technologies**

Course code: **UGCMSCC11**

Course Objectives:

1. Knowledge of the design and functionality of Internet and the issues related to it.
2. Capability to develop basic webpages and other internet based services.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define the terms related to the Internet and how the Internet is changing the world	R(1)	PO1	PSO1
CO2	To understand how computers are connected to the Internet and demonstrate the ability to use the World Wide Web	U(2)	PO2	PSO1 PSO2
CO3	Demonstrate the ability to make use of electronic mail and other internet based services.	Ap(3)	PO4	PSO3



CO4	Compare and analyse the design principles of Web pages and how they are created.	An(4)	PO4	PSO4
CO5	To develop an ability to create basic Web pages with HTML	C(6)	PO4	PSO6

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SEMESTER- V				
Name of the course: Theory of Computation				
Course code: UGCMSCC11				

Course Objectives:

1. Knowledge and understanding of formal connection between algorithmic problem solving and the theory of languages.
2. Understand the key topics of theory of computation, and to have the opportunity to explore the current topics in this area.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	To understand a formal connection between algorithmic problem solving and the theory of languages.	U(2)	PO2	PSO1
CO2	Ability to identify the practical view towards the applications of these ideas in the engineering part as well.	Ap(3)	PO2	PSO2
CO3	Become proficient in key topics of theory of computation, and to have the opportunity to explore the current topics in this area.	An(4)	PO4	PSO3
CO4	Evaluate and develop by applying the theoretical knowledge into a mathematical (abstract) view towards algorithmic design and in general computation itself.	E (5), C(6)	PO5	PSO5

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SEMESTER- VI				
Name of the course: Artificial Intelligence				
Course code: UGCMSCC13				

Course Objectives:

1. Knowledge of the basic of artificial intelligence techniques such as search problems, constraint satisfaction problem, as a planning problem, constraint propagation algorithms, etc.
2. Understanding the capabilities and limitations of artificial intelligence techniques

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.	U(2)	PO2	PSO2



CO2	Explain the limitations of current Artificial Intelligence techniques.	U(2)	PO2	PSO2
CO3	Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.	Ap(3)	PO4	PSO3 PSO4
CO4	Categorize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, etc).	An(4)	PO4	PSO4
CO5	Evaluate and implement basic AI algorithms (e.g., standard search or constraint propagation algorithms).	E(5)	PO5	PSO4
CO6	Design and perform an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.	C(6)	PO6	PSO6

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SEMESTER- VI
Name of the course: Computer Graphics
Course code: UGCMSCC14

Course Objectives:

1. Basic knowledge of design and implementation issues of computer graphics.
2. Understanding of the relevant mathematics and different algorithms for generation of computer graphics.
3. Understanding of fundamentals of animation and virtual reality technologies.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to recall the concepts and relevant mathematics of computer graphics.	R(1)	PO1	PSO1
CO2	Ability to describe the importance of viewing and projections and define the fundamentals of animation and Virtual reality technologies	U(2)	PO2	PSO1 PSO2
CO3	Ability to apply various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.	Ap(3)	PO4	PSO3 PSO4
CO4	Ability to design basic graphics application programs that display graphic images to given specifications.	C(6)	PO5	PSO5 PSO6

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Discipline Specific Elective Courses

Name of the course: Microprocessor
Course code: UGCMSDSE01

Course Objectives:

1. To make students understand the basic architecture, operation and applications of Microprocessor.
2. To understand the basic concepts of microprocessor up gradation and their advantages over older versions.
3. To make students know the different ways of communicating with internal and external I/O devices.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define the basic architecture, operation and applications of Microprocessor.	R(1)	PO1	PSO1
CO2	Ability to understand interrupts as well as their usage in different hardware approaches.	U(2)	PO2	PSO1
CO3	Ability to analyse the basic architecture of upgraded microprocessor and their advantages over older versions.	An(4)	PO4	PSO3 PSO4
CO4	Ability to evaluate different ways of communicating with internal and external I/O devices.	E(5)	PO5	PSO5

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Name of the course: Numerical Methods
Course code: UGCMSDSE02

Course Objectives:

1. To understand the underlying mathematical formulations of various numeral methods.
2. To understand the Bisection method, Secant method, Regula-Falsi method, Newton-Raphson method and different approaches of respective methods.
3. To gain the ability to design Computer Algebra Systems using MATLAB / MATHEMATICA / MAPLE for real world applications.

Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understand the underlying mathematical formulations across various numerical analysis rules and methods.	U(2)	PO2	PSO2
CO2	Categorize between Bisection method, Secant method, Regula-Falsi method, Newton-Raphson method and different approaches of respective methods.	An(4)	PO4	PSO3 PSO4
CO3	Ability to choose appropriate algorithm for solving different problems.	E(5)	PO5	PSO5
CO4	Design and adapt existing approaches to suit applications.	C(6)	PO6	PSO6
CO5	Design and implementation of Computer Algebra Systems	C(6)	PO6	PSO6



	for real world applications.			
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Name of the course: Cloud Computing
Course code: UGCMSDSE03

Course Objectives:

1. To understand the trade-offs between deploying applications in the cloud and over the local infrastructure
2. To be able to program data intensive parallel applications in the cloud
3. Ability to deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.

Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understanding of deploying applications over commercial cloud computing infrastructures.	U(2) Ap(3)	PO2	PSO2 PSO3
CO2	Compare the advantages and disadvantages of various cloud computing platforms	An(4)	PO4	PSO4
CO3	Analyse the trade-offs between deploying applications in the cloud and over the local infrastructure	An(4)	PO4	PSO4
CO4	Analyse the performance, scalability, availability of the underlying cloud technologies and software and also identify security and privacy issues in cloud computing	An(4)	PO4	PSO4
CO5	Explain recent research results in cloud computing and identify their pros and cons.	E(5)	PO5	PSO5 PSO6
CO6	Design programs for applications in the cloud to solve real-world problem using cloud computing through group collaboration.	C(6)	PO6	PSO6

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Name of the course: Machine Learning
Course code: UGCMSDSE04

Course Objectives:

1. Basic knowledge of the underlying mathematical relationships across various machine learning algorithms.
2. Capability to apply the knowledge of machine learning algorithms on real world data for practical understanding of advanced soft computing applications.



Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understand the underlying mathematical relationships across various machine learning algorithms.	U(2)	PO2	PSO2
CO2	Categorize between supervised, unsupervised machine learning approaches	An(4)	PO4	PSO3 PSO4
CO3	Ability to choose appropriate machine learning algorithm for solving a problem	E(5)	PO5	PSO5
CO4	Design and adapt existing machine learning algorithms to suit applications	C(6)	PO6	PSO6
CO5	Design and implement machine learning algorithms to real world applications	C(6)	PO6	PSO6

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Name of the course: Data Mining
Course code: UGCMSDSE05

Course Objectives:

1. Gaining the knowledge of clustering, classification, association finding, feature selection and visualisation on real world data.
2. To understand and apply data mining software and toolkits in a range of applications for data preparation, modelling and evaluation

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understand the techniques of clustering, classification, association finding, feature selection and visualisation on real world data.	U(2)	PO1 PO2	PSO2
CO2	Apply data mining concepts on real world data for analysis and development.	Ap(3)	PO2	PSO3
CO3	Ability to assess whether a real world problem has a data mining solution.	E(5)	PO5	PSO5
CO4	Ability to design a data mining process for an application, including data preparation, modelling and evaluation for research and development.	C(6)	PO6	PSO6

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Name of the course: Dissertation / Project work
Course code: UGCMSDSE06

Course Objectives:

1. Opportunity to apply and extend material learned throughout the program.
2. Conceptual clarity about a certain state-of-the-art topic.



3. Understanding team work and development of social and professional skills

Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understand project characteristics and various stages of a project	U(2)	PO2	PSO2
CO2	Understand the conceptual clarity about project organization and feasibility analyses.	U(2)	PO2	PSO2
CO3	Apply sound technical knowledge of their selected project topic in real life application development.	Ap(3)	PO4	PSO3
CO4	Analyse the learning and understand techniques for project planning, scheduling and execution control	An(4)	PO4	PSO4
CO5	Explain recent research oriented development of their selected project topic	E(5)	PO5	PSO5
CO6	Ability to work in a team for well-planned design and development of futuristic applications.	C(6)	PO6	PSO5 PSO6

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Generic Elective Courses

Name of the course: Computer Fundamentals
Course code: UGCMSG01

Course Objectives:

1. Basic knowledge of the computer hardware and how software interacts with computer hardware and the concepts of addressing modes.
2. Gain knowledge of Boolean algebra and Boolean expressions.
3. Understanding of number systems and their use in computing environment.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Understand the basics of computer hardware and how software interacts with computer hardware and the concepts of addressing modes.	U(2)	PO1	PSO1 PSO2
CO2	Apply logic gates and Boolean expression using Boolean algebra.	Ap(3)	PO2	PSO3
CO3	Analyse and design combinational and sequential circuit.	An(4)	PO4	PSO4

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Name of the course: **Introduction to Database System**

Course code: **UGCMSGE02**

Course Objectives:

1. Gain knowledge of database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems.
2. Be acquainted with the basics of transaction processing and concurrency control and understand the database storage structures and access techniques.
3. Understanding of normalization theory and apply such knowledge to the normalization of a database.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Ability to define the database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems	R(1)	PO1	PSO1
CO2	Ability to understand the basics of transaction processing and concurrency control and understand the database storage structures and access techniques.	U(2)	PO2	PSO1 PSO2
CO3	Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.	Ap(3)	PO3	PSO2
CO4	Compare, contrast and analyse the various emerging technologies for database systems.	An(4)	PO4	PSO3 PSO4
CO5	Analyse strengths and weaknesses of the applications of database technologies to various subject areas.	E(5)	PO4	PSO4
CO6	Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model.	C(6)	PO6	PSO6

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Name of the course: **Programming Fundamentals using C/C++**

Course code: **UGCMSGE03**

Course Objectives:

1. Knowledge and capability to find computational solution of different problems.
2. Capability to construct algorithm of problems.
3. Understanding the C/C++ programming language.
4. Knowledge of basic programming aspects such as loop, function, array, structure, class, objects, etc.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Discuss, memorize and understand the different concept of C/C++ programming constructs and classes for code reuse.	R(1), U(2)	PO2	PSO1



CO2	Solve problems and propose algorithms, pseudo codes and flowcharts for it.	Ap(3), C(6)	PO6	PSO5 PSO6
CO3	Identify real life problems and convert it to computational problems.	Ap(3)	PO3	PSO2 PSO3
CO4	Apply the concepts of structural and object oriented programming such as loops, functions, structure, class, inheritance, friend functions, and virtual functions to develop programs for problem solving.	Ap(3), C(6)	PO3	PSO3
CO5	Analyse and Compare approaches to model efficient and standard programs.	An(4)	PO4 PO5	PSO4
CO6	Evaluate, design, compile, run and debug programs for software development.	E(5)	PO4 PO5	PSO5 PSO6

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

Name of the course: Programming in Python
Course code: UGCMSG04

Course Objectives:

1. Knowledge of different concept of Python programming such as classes, code reusability, loops, functions, inheritance, recursion, list, tuple, etc.
2. Capability to design and reuse codes with the aid of object oriented programming.
3. Capability to develop real life problem solving applications.

Course Outcomes

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO1	Define algorithms and to draw flowcharts for program writing.	R(1)	PO1	PSO1
CO2	Ability to show the installation and running of the Python interpreter	U(2)	PO1	PSO2
CO3	Understand the Numbers, Math functions, Strings, List, Tuples, Dictionaries and operators in Python	U(2)	PO2	PSO2
CO4	Understand and summarize different File handling operations and packages	U(2)	PO2	PSO2
CO5	Apply different decision making statements and loops, different functions and modules	Ap(3)	PO3	PSO4
CO6	Design programs using Python for problem solving	C(6)	PO5	PSO5

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Ability Enhancement Compulsory CourseName of the course: **English Communication**Course code: **UGCMSAECC01****Course Objectives:**

1. Students will have the capability to read, write and communicate fluently in English.
2. Students will have the capability to distinguish more important ideas from less important ones.

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO 1	Recall English Phonetic Symbols and demonstrate their use with emphasis on various scientific terms.	R(1) U(2)	PO2	PSO1
CO 2	Utilize various processes of communication	Ap(3)	PO2	PSO2
CO 3	Compare and analyze dialogue, group discussion, presentation, interview techniques	An(4)	PO5	PSO2
CO 4	Judge different techniques of reading and writing skills.	E(5)	PO5 PO6	PSO3
CO 5	Develop the skill to create original write up in the form of report, proposal, paragraph, review etc.	C(6)	PO4 PO5	PSO5

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Name of the course: **Environmental Science**Course code: **UGCMSAECC02****Course Objectives:**

1. Remembers and understands the concept, components and function of natural resources and ecosystems.
2. Understand and evaluate the Cause, effects and control measures of various environmental pollutants.
3. Understand the basic idea about the disasters and its management.
4. Understand and apply the knowledge about the social, environmental issues and environmental legislation.

Course Outcomes:

CO No.	Course Outcomes:	Cognitive Level	PO Addressed	PSO Addressed
CO 1:	Define and demonstrate the concept, components and function of natural resources and ecosystems.	R(1) U(2)	PO1	PSO1
CO 2:	Define, illustrate and analyse the cause, effects and control measures of various environmental pollutants.	R(1) U(2)	PO 3	PSO1



		An(4)		
CO 3:	Demonstrate the basic idea about the disasters and its management.	U(2)	PO 3	PSO2
CO 4:	Illustrate and apply the knowledge about the social, environmental issues and environmental legislation.	U(2) Ap(3)	PO 4	PSO3 PSO4
CO 5:	Define, demonstrate and evaluate the impact of human population on the Environment	R(1) U(2) E(5)	PO 6	PSO5

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Skill Enhancement Course

Name of the course: **Value Education and Indian Culture**

Course code: **UGCMSAECC02**

Course Objectives:

1. Attain awareness about daily routine, self-evaluation & Integral Personality Development
2. Understand the educational needs, the Power of thoughts and the Science of Peace
3. Understand the relation: Values and enlightened citizenship
4. Attain awareness about the Indian Practice and Culture
5. Demonstrate the importance of Four Yogas
6. Acquire idea about Modern India: her hopes, challenges and Swami Vivekananda

Course Outcomes:

CO No.	Course Outcomes	Cognitive Level	PO Addressed	PSO Addressed
CO 1:	Define, demonstrate and apply the daily routine, self-evaluation & Integral Personality Development	R(1), U(2), Ap(3)	PO1	PSO1
CO 2:	Demonstrate, and apply the Power of thoughts & the Science of Peace	U, Ap	PO 3	PSO2 PSO3
CO 3:	Demonstrate the relation between Values and enlightened citizenship	U	PO 3	PSO5
CO 4:	Discuss the awareness about the Indian Practice and Culture	C	PO 4	PSO3
CO 5:	Demonstrate and practice the Four Yogas	U, Ap	PO 6	PSO2
CO 6:	Explain and analyse the idea about Modern India: her hopes, challenges and Swami Vivekananda	U, An	PO 4, 6	PSO4

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

