# Bachelor of Science
# Subject: Computer Science

## Program Specific Outcomes

***After completion of B.Sc. Computer Science students will be able to-***

1. Develop and analyse a problem, identify and define the computing requirements, which may be appropriate to its solution
2. Pursue advanced studies and research in computer science
3. Do jobs in any Government or private sector where Computer Science subject is required
4. Appear in different administrative exams conducted by different state PSCs and UPSC
5. Work as lab assistant in schools and colleges
6. Be entrepreneurs who can innovate and develop software product
7. Study the basis of science for coherent understanding of the academic field to pursue multi and interdisciplinary science careers in future
8. Think critically, follow innovations and developments in science and technology

## I Year / Certificate Course

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER SYSTEM ARCHITECTURE***<br><br>**S1-COSC-1T**<br>***Major-I*** | ***After the completion of the course, students will be able to-***<br>1. Understand the basic structure, operation and characteristics of digital computer<br>2. Design simple combinational digital circuits based on given parameters<br>3. Familiar with working of arithmetic and logic unit as well as the concept of pipeline<br>4. Know about hierarchical memory system including cache memory and virtual memory<br>5. Understand concept and advantages of parallelism, threading, multi processors and multicore processors<br>6. Know the contribution of Indians in the field of computer architecture and related technologies |
| ***PROGRAMMING METHODOLOGIES & DATA STRUCTURES***<br><br>**S1-COSC-2T**<br>***Major-II / Minor / Open Elective*** | ***After the completion of the course, students will be able to-***<br>1. Learn the concept of algorithm and to draw flowchart<br>2. Learn to formulate iterative solution and array processing algorithms for problems<br>3. Use recursive techniques, pointers and searching methods in programming<br>4. Familiar with fundamental data structures and their implementation; become accustomed to the description of algorithms in both functional and procedural styles<br>5. Have knowledge of complexity of basic operations like insert, delete, search on these data structures<br>6. Understand the graph and different graph traversal techniques<br>7. Implement and know the applications of algorithm for searching and sorting etc. |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER ARCHITECTURE LAB (PRACTICAL)***<br><br>**S1-COSC-1P**<br>***Major-I (Practical)*** | ***Through practicals learners will be able to-***<br>1. Design half and full adder circuit using basic gates<br>2. Verify the behaviour of logic gates using truth tables<br>3. Design and construct flip flops<br>4. Implement Binary-to-Gray, Gray-to-Binary code conversions |
| ***OFFICE TOOLS & PROGRAMMING METHODOLOGY LAB (PRACTICAL)***<br><br>**S1-COSC-2P**<br>***Major-II / Minor / Open Elective (Practical)*** | ***Through practicals learners will be able to-***<br>1. Write efficient and well-structured algorithms and flowcharts<br>2. Implement algorithms for searching and sorting |

# II Year / Diploma Course

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER NETWORKS AND INFORMATION SECURITY***<br><br>**S2-COSC-1T**<br>***Major-I*** | ***After the completion of the course, students will be able to-***<br>1. Define and describe the components of Data Communication System such as various protocols, OSI Model, data transmission in Analog and digital format<br>2. Identify and differentiate among the network devices and drives<br>3. Learn and describe various error detection and correction methods<br>4. Define the various terminologies used in Network and Application layers<br>5. Compare the various network technologies and can decide the suitable technology installation as per requirement and environment at any work place<br>6. Describe the various protocols and can identify application areas of each protocol<br>7. Know the fundamentals of network and information security issues, laws, and various security technologies which can be applied on work place |
| ***OBJECT ORIENTED PROGRAMMING WITH JAVA***<br><br>**S2-COSC-2T**<br>***Major-II / Minor / Open Elective*** | ***After the completion of the course, students will be able to-***<br>1. Implement Object Oriented programming concept using basic syntax of control structures, strings and function for developing skills of logic building activity<br>2. Identify classes, objects, members of a class and the relationships among them needed for finding the solution to a specific problem<br>3. Demonstrate how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved<br>4. Understand different exception handling mechanisms and concept of multi-threading for robust faster and efficient application development<br>5. Identify and describe common abstract user interface components to design GUI in Java using Applet and AWT along with response to events<br>6. Identify, Design & Develop complex Graphical user interfaces using principal java Swing classes based on MVC architecture |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER NETWORKS LAB (PRACTICAL)***<br><br>**S2-COSC-1P**<br>***Major-I (Practical)*** | ***Through practical learners will be able to-***<br>1. Learn and identify various cables used in the networking<br>2. Identify various connectors used to connect different cables |
| ***JAVA PROGRAMMING LAB (PRACTICAL)***<br><br>**S2-COSC-2P**<br>***Major-II / Minor / Open Elective (Practical)*** | ***Through practical learners will be able to-***<br>1. Implement OOP's concept using basic control structures, strings and functions<br>2. Demonstrate how to achieve reusability using inheritance |

# III Year

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***DATABASE MANAGEMENT SYSTEM (DBMS)***<br><br>**BSC1Y315** | ***After the completion of the course, students will be able to-***<br>1. Understand the basic concept of database management system<br>2. Draw Entity-Relationship diagrams<br>3. Understand relational calculus<br>4. Differentiate between database management system and traditional database<br>5. Discuss normalization techniques<br>6. Learn SQL and Oracle database for indexing and hashing |
| ***OPERATING SYSTEM***<br><br>**BSC1Y316** | ***After the completion of the course, students will be able to-***<br>1. Understand basics of system software<br>2. Learn the different types of Operating System<br>3. Learn different scheduling algorithm and page replacement algorithm<br>4. Learn swapping and concept of segmentation<br>5. Understand memory allocation process<br>6. Learn types pf deadlock<br>7. Learn different types of directory structure<br>8. Learn LINUX command |
| ***LAB WORK (PRACTICAL)***<br>**BSC1Y315(P)** | ***At the end of the lab work, a student will be able to-***<br>Perform various types of SQL queries. |

# Master of Science in Computer Science

## Program Specific Outcomes

***Upon completion of M.Sc. Computer Science program, students will be able to-***

1. Impart comprehensive knowledge and practical skills covering all aspects of computer uses in business, industries and service sector
2. Impart expertise to perform as application system designer, implementors and managers in major areas of computer applications
3. Gain knowledge of advanced computer subjects including software and hardware
4. Do jobs in any Government or private sector where Computer Science subject is required
5. Work as system managers and hardware engineers in IT industry

# I Semester

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER ARCHITECTURE***<br><br>**MSC041** | ***After the completion of the course, students will be able to-***<br>1. Understand Number System & their conversion, and Boolean Algebra<br>2. Design different Combinational Circuits and Sequential Circuits<br>3. Learn flip flops, registers, counters etc.<br>4. Gain knowledge of Memory Organization<br>5. Gain knowledge of Microprocessor 8085 & 8086<br>6. Learn Input Output bus &interface modules<br>7. Understand basics of bit-slice microprocessor |
| ***DISCRETE MATHEMATICS WITH DATA STRUCTURE***<br><br>**MSC042** | ***After the completion of the course, students will be able to-***<br>1. Gain knowledge of Set theory, relation and function<br>2. Learn concept of data structure, stacks and queues with their applications<br>3. Learn basic memory representation & operations on linked lists<br>4. Learn concept of Tree and Graph with their types.<br>5. Write Kruskal and Prim's algorithm<br>6. Learn different types of searching and sorting with complexities<br>7. Gain knowledge of string processing and word processing |
| ***OPERATING SYSTEM***<br><br>**MSC043** | ***After the completion of the course, students will be able to-***<br>1. Understand concept of OS and its services<br>2. Learn File support, access and allocation methods<br>3. Gain knowledge of directory system<br>4. Understand memory management<br>5. Gain knowledge of segmentation & paging<br>6. Learn deadlock problem, prevention & recovery<br>7. Learn network & distribution system<br>8. Learn architecture of UNIX OS |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***OBJECT ORIENTED PROGRAMMING WITH C++***<br>**MSC044** | ***After the completion of the course, students will be able to-***<br>1. Learn definition & features of OOPs<br>2. Learn difference between procedural programming & OOPs<br>3. Gain knowledge of C and C++ programs<br>4. Gain knowledge of Constructor, Destructor, Overriding, Overloaded Operator etc.<br>5. Learn concept of File Handling |
| ***PRACTICAL BASED ON C++ (PRACTICAL)***<br>**MSC045** | ***At the end of the lab work, a student will be able to-***<br>1. Practical knowledge of object oriented features of C++<br>2. Knowledge of stacks, queues, recursion, linked list and their implementation in C++ |
| ***PRACTICAL BASED ON DATA STRUCTURE (PRACTICAL)***<br>**MSC046** | ***At the end of the lab work, a student will be able to-***<br>Learn programs of Link List, Searching and Sorting |

# II Semester

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHOD***<br><br>**MSC2087** | ***After the completion of the course, students will be able to-***<br>1. Find solution of polynomial eq. and transcendental eq. using numerical methods and calculate errors in their solution<br>2. Find solution of problem using Numerical interpolation formulae<br>3. Solve Numerical integration using Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule etc.<br>4. Find solution of ordinary differential eq. using Picard's method, Runge Kutta method, Euler's method etc.<br>5. Learn concept of Probability distribution |
| ***SOFTWARE ENGINEERING***<br><br>**MSC2088** | ***After the completion of the course, students will be able to-***<br>1. Learn basics of Software Engineering<br>2. Gain Knowledge of life cycle models and software cost estimation techniques<br>3. Learn software design<br>4. Gain knowledge of data flow diagrams, structure charts, structured flow charts, decision table<br>5. Learn software reviews, software reliability and software testing techniques<br>6. Learn about building box & tools of CASE<br>7. Learn about basics of Ada & relevant features of Software Engineering |
| ***DATA BASE MANAGEMENT SYSTEM (ORACLE BASED)***<br><br>**MSC2089** | ***After the completion of the course, students will be able to-***<br>1. Familiar with Relational Algebra<br>2. Learn & draw ER diagram<br>3. Learn about domains, relations & keys<br>4. Understand basic structure of SQL<br>5. Learn about set operations, join relations, DDL & DML<br>6. Learn, analyse & use noramlisation & different normal forms<br>7. Learn concept of distributed databases, data storage, replication & fragmentation<br>8. Gain knowledge of physical storage media & magnetic disks<br>9. Learn about file organization, records, indexing etc.<br>10. Get basic idea of network & hierarchical models |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***COMPUTER NETWORKS***<br><br>**MSC2090** | ***After the completion of the course, students will be able to-***<br>1. Learn line configuration, topology, signals, encoding & modulation<br>2. Gain knowledge of networking layers & OSI model<br>3. Learn transmission media & its types<br>4. Gain knowledge of error detection & correction code like parity check, CRC & Hamming code<br>5. Basic concept of Cryptography and ATM<br>6. Understand basics of random access & ALOHA<br>7. Learn about LAN like IEEE802.3,802.4 & 802.5<br>8. Learn about design issues, virtual circuits& routing algorithms<br>9. Gain basic idea of presentation, SNMP & ASN |
| ***PRACTICAL – I***<br>***(BASED ON ORACLE)***<br>***(PRACTICAL)***<br>**MSC2091** | ***At the end of the lab work, a student will be able to-***<br>1. Build and maintain the database handling in real life applications and daily needs<br>2. Perform various types of SQL queries |
| ***PRACTICAL – II***<br>***(BASED ON NUMERICAL METHODS)***<br>***(PRACTICAL)***<br>**MSC2333** | ***At the end of the lab work, a student will be able to-***<br>Create programs of numerical methods (Newton Raphson method, Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule etc) in C Language. |

## III Semester

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***THEORY OF COMPUTATION***<br><br>**MSCC046301** | ***After the completion of the course, students will be able to-***<br>1. Learn Principle of mathematical induction and automation system<br>2. Learn construction of grammar & derivation of language generated by grammar<br>3. Gain knowledge of closure properties of language, decision algorithm & Pumping lemma<br>4. Familiar with regular expressions<br>5. Learn definition, construction of DFA, relation of PDA to CFG<br>6. Learn 2 way PDA , linear bounded automata & parsing<br>7. Learn definition, determinism & non-determinism in TM<br>8. Learn construction of TM, undecidable problems, post correspondence problem<br>9. Gain knowledge of complexity theory, Russel's paradox & NP-completeness |
| ***TECHNIQUES OF OPERATION RESEARCH***<br><br>**MSCC046302** | ***After the completion of the course, students will be able to-***<br>1. Learn about features, scope & models of OR<br>2. Solve linear programming problem using Graphical and Simplex method<br>3. Solve Assignment Problem and Transportation Problem<br>4. Create network diagram & critical path of a given problem<br>5. Learn CPM and PERT<br>6. Gain knowledge of Queuing theory<br>7. Gain knowledge of replacement problems<br>8. Learn inventory models, definition & types of inventory |
| ***OBJECT ORIENTED PROGRAMMING WITH JAVA***<br><br>**MSCC046303** | ***After the completion of the course, students will be able to-***<br>1. Learn basics of JAVA<br>2. Learn classes, object, methods, constructors, inheritance etc.<br>3. Understand packages (import & create) and interface<br>4. Learn exception handling in java<br>5. Learn concept of multithreading, implementation of Runnable Interface & Extending Thread class<br>6. Understand basics of Applet, AWT, Event Handling, Java beans & Servlets |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***VISUAL BASIC***<br><br>**MSCC046307** | ***After the completion of the course, students will be able to-***<br>1. Understand the basics of Visual Basic programming<br>2. Learn variable, constant, control statement, looping statement in VB<br>3. Learn how to work with forms, linking form with other database tables<br>4. Learn how to use data manager, dialogue boxes, built-in and customized dialog boxes<br>5. Understand how to communicate with other Windows application<br>6. Create Crystal Report<br>7. Understand ActiveX control and OLE Automation |
| ***LAB WORD BASED ON JAVA (PRACTICAL)***<br>**MSCC046308** | ***At the end of the lab work, a student will be able to create programs in JAVA.*** |
| ***MINOR PROJECT***<br>**MSCC046309** | ***After the completion of project, students will be able to do minor project based on VB/.NET.*** |

# IV Semester

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***SYSTEMS PROGRAMMING***<br><br>**MSCC046401** | ***After the completion of the course, students will be able to-***<br>1. Understand the concept of machine language and assembly language<br>2. Gain the knowledge of assembler design & its types<br>3. Learn basics of Macro Processors and relationship between Macro Processor and assembler<br>4. Gain the knowledge of relocation, linking, loaders & self relocating programs<br>5. Understand Compiler Design and its structure<br>6. Learn about syntax analysis & parsing techniques<br>7. Learn about intermediate code generation, intermediate languages & code optimization<br>8. Gain knowledge of machine model of code generator, error detection & recovery |
| ***COMPUTER GRAPHICS***<br><br>**MSCC046402** | ***After the completion of the course, students will be able to-***<br>1. Understand I/O devices, CRTs & DVST<br>2. Gain the knowledge of various algorithms such as, Polygon Filling algorithm, Character Generation algorithm, Bresenham's line algorithm etc.<br>3. Learn basics of line attributes, color & gray scale levels, color model<br>4. Knowledge of translation, rotation, scaling, shearing & reflection in 2D & 3D<br>5. Learn about different types of projections<br>6. Learn about Hermite cubic curves & surfaces, Beizer & B-spline curves & surfaces etc. |

| COURSE TITLE | COURSE LEARNING OUTCOMES |
|---|---|
| ***INTERNET AND WEB TECHNOLOGY***<br><br>**MSCC046406** | ***After the completion of the course, students will be able to-***<br>1. Learn brief history of Internet<br>2. Learn about DNS<br>3. Learn about TCP/IP protocol on the internet<br>4. Learn about E-mail, newsgroups, ftp, chatting, www etc<br>5. Understand different types of internet security<br>6. Familiar with different web terminologies like website, web server, http, web pages ,web portal URL, search engine, HTML, etc.<br>7. Learn about virtual network, value added network, private network<br>8. Learn about project Gutenberg, electronic journals, electronic books etc.<br>9. Learn java script programming language |
| ***LAB WORK BASED ON COMPUTER GRAPHICS (PRACTICAL)***<br>**MSCC046411** | ***At the end of the lab work, a student will be able to create programs in Graphics.*** |
| ***PROJECT***<br>**MSCC046412** | ***After the completion of project, students will be able to Develop Software.*** |

Digitally signed by Brij Kishore Tiwari
Date: 2023.08.24 13:20:13

**(Dr. Archana Shrotriya)**
HOD
*Department of Computer Science*

**(Dr. Niranjan Shrotriya)**
CO-ORDINATOR, IQAC
*Govt. Postgraduate College, Guna (M.P.)*

**(Dr. B.K. Tiwari)**
PRINCIPAL
*Govt. Postgraduate College, Guna (M.P.)*