

**NIT SCHEME**  
**COURSE OF STUDY AND SCHEME OF EXAMINATION OF B.TECH./B.ARCH./M.TECH/M.C.A.**  
**NATIONAL INSTITUTE OF TECHNOLOGY OF RAIPUR**

Branch:- **Master of Computer Applications (M.C.A.)**  
Semester:- **I<sup>st</sup> Sem.**

Course:- **P.G.**

S. No.	Board of Study	Subject Code	Subject Name	Period Per Week			Scheme of Examination			Total Marks	Credit [L+(T+P)/2]
				L	T	P	ESE	CT	TA		
1.	MASTER OF COMP. APP.	CA40111(CA)	Foundation of Information Technology	4	1	0	100	20	20	140	5
2.	MATHS	MA40112(CA)	Mathematical Foundation of Computer Science	4	1	0	100	20	20	140	5
3.	MASTER OF COMP. APP.	CA40113(CA)	Programming & Problem Solving in C	4	1	0	100	20	20	140	5
4.	MASTER OF COMP. APP.	CA40114(CA)	Computer Organization & Architecture	4	1	0	100	20	20	140	5
5.	HUMANITIES & SOCIAL SCIENCES	HS40115(CA)	Professional Communication in English	4	1	0	100	20	20	140	5
6.	MASTER OF COMP. APP.	CA40121(CA)	Programming Lab in C	0	0	6	75	-	50	125	3
7.	MASTER OF COMP. APP.	CA40122(CA)	Information Technology Lab	0	0	6	75	-	50	125	3
8.	HUMANITITES & SOCIAL SCIENCES	HS40123(CA)	Professional Communication in English Lab	0	0	2	-	-	50	50	1
<b>Total</b>				<b>20</b>	<b>5</b>	<b>14</b>	<b>650</b>	<b>100</b>	<b>250</b>	<b>1000</b>	<b>32</b>

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1<sup>st</sup> Semester MCA Code : CA40111(CA)**

**Foundation of Information Technology**

**UNIT-1 Introduction To Computer & Hardware:**

Basic concepts of Information Technology, Concepts of Data and Information, data processing, History of computers, organization of computers, input and output devices, storage devices and file organization.

**UNIT-2 Operating System:**

System software, application software, utility packages, compilers, interpreters, operating systems, Elementary commands of DOS, Windows and UNIX operating systems (file handling, directory management and general purpose user interfacing commands).

**UNIT-3 Programming Languages:**

Machine language, assembly languages, high level languages, forth generation languages, General concepts of OOPS (Object oriented programming) and SQL (Structured Query Languages); Computer Viruses, worms; Compiler, Interpreter, Assembler; Algorithm & Flowchart.

**UNIT-4 Communication Technologies:**

Communication system elements communication modes (analog and digital, synchronous and asynchronous, simplex, half duplex and full duplex, circuit switching and packet switching) Communication media : (speed and capacity, twisted pair, coaxial fiber optics, wireless), common network components, hosts and servers, work stations, network topologies and network protocols ^ (ISO/OSI Ref. Model and TCP/IP)

**UNIT-5 Applications of Information Technology:**

Applications of IT in business, industry, home education and training, entertainment, science and engineering and medicine, multimedia data types (graphics, images, audio video), Virtual reality applications, Internet, World Wide Web (WWW), Domain names, e-mail, teleconferencing, e-commerce, hypermedia, data warehousing.

**Text Books;** 1. Sanders. D.H. " Computers Today " McGraw Hill  
2. S. K. Basandra "Computers Today" Galgotia Publication.

**References:** 1. Leon & Leon "Computers Today "Leon Vikas Pub.  
2. S Jaiswal, " Information Technology Today " Galgotia Pub.  
3. P. K. Sinha ."Introduction to Computers "  
4. V. Rajaraman "Fundamental of computer " PHI.

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1<sup>st</sup> Semester MCA Code : MA40112(CA)**

**Mathematical Foundation of Computer Science**

**Unit – I: - Mathematical Logic & Boolean Algebra**

Statements and Notations, Connectives, Normal Forms. Basic concepts of Boolean Algebra, Boolean functions, Applications of Boolean Algebra in switching circuits, logic circuits, Karnaugh map method for simplification of Boolean expressions.

**Unit - II: -Ordered Structures, Relations & Functions**

Relation, Properties of Relation, Partial order Relation, Function, properties of function, Composition of Functions, Recursive functions, Lattice, Lattice as algebraic system, sub-lattices, some special lattices.

**Unit – III: - Group Theory**

Definition and examples, Permutation group, cyclic group, subgroup, cosets, Lagrange's theorem, some theorems on subgroup, Homomorphism and Isomorphism of groups, Normal subgroup, Quotient group, Fundamental theorems of homomorphism on groups.

**Unit – IV: - Graph Theory**

Basic concepts of graph theory, Types of graphs, Paths and Circuits, Trees and Fundamental Circuits, Matrix Representation of Graphs, Directed Graphs.

**Unit - V: - Ring, Field & Elements of Coding Theory**

**Ring-** Definition & examples, subring, integral domain. **Field-** Definition and examples, Elements of Coding Theory, parity check code, Binary symmetrical channel, Hamming weight and distance, Group codes, Parity check and Generator matrix, Decoding, Hamming matrices, Coset decoding, Hamming codes.

**TEXT BOOKS:**

1. James L. Hein, Discrete Structure, Logic and Computability, Narosa Pub. House.
2. Tremblay, J.P. & Manohar R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill.

**REFERENCE BOOKS:**

1. Ralph, Ginaldi, Discrete and Combinatorial Mathematics, Pearson Education.
2. N.Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall.
3. Kolman, B, Busby, R.C.Ross, S.C. Discrete Mathematical Structures, Pearson Education.
4. Liu, C.L. Elements of Discrete Mathematics, Tata McGraw Hill.

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1<sup>st</sup> Semester MCA Code : CA40113(CA)**

**PROGRAMMING & PROBLEM SOLVING IN C**

**UNIT-1 Introduction To 'C' Language**

Problem solving methods. Introduction to algorithms and flowcharts.. Top down design. Bottom up design. Structure of a C program. Constant and variable. Identifiers and keywords. Data types. Declarations. Operators and Expressions, Priority and associativity of operators. Type conversion and type casting. Symbolic constants. Input-Output functions - getchar, putchar, scanf, printf, gets, puts. Control Statements : while, do-while, for statements, nested loops. If-else, switch, break, continue and goto statements, comma operator. Ternary operator.

**UNIT-2 Arrays and Functions**

Arrays: Defining a array, Passing to a function, Multi dimensional arrays. Strings in C, Operations and Functions of Strings, Storage classes. Arguments; Return value; Parameter passing - Call by value, Call by reference; return statement, calling a function, Recursion basics. Library functions

**UNIT-3 Pointers and preprocessor directives**

Pointers: Declarations. Passing to a function. Operations on pointers. Pointers and arrays, Array of pointers.

C-preprocessor-basics-#include, #define, #undef, conditional compilation directive like #if, #else, #elif, #ifdef and #ifndef. Command line arguments.

**UNIT-4 Structures**

Defining and processing. Passing to a function. Pointer to structures. Structure within structure. Array in structure. Array of structures. Unions Dynamic memory management functions like malloc() , callocQ, free(), string()

**UNIT-5 File handling and related functions;.**

Data files: Open, close, create, process. Unformatted data files  
Different modes of accessing a file :fopen ,read ,write, fprintf and  
fscanf and all related functions of a file seekg, seekp,tellp, tellg

**Text Book:**

1. Gottfried(schaum series), Programming and problem solving in 'C',TMH.
2. Kanetkar Y.P. Let us C, BPB Publications

**Reference Books**

1. The C programming language, by PHI Kernighan and Ritchie
2. The Spirit of C, Cooper Mullish, Jaico Publishing House, Delhi
3. Pointers in C, by Kanetkar Y.P. , BPB Publications
4. Programming in C , by McGraw Hill, New York. 1990.
5. programming in C ,Jeeyapoovan,Pearson Education.
6. Programming in C, E.Balagurusamy

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1<sup>st</sup> Semester MCA Code : CA40114(CA)**

**COMPUTER ORGANIZATION & ARCHITECTURE**

**UNIT-1 Data Representation and Digital Components:**

Number systems, integer and floating point representation, character codes (ASCII, EBCDIC), Error detection and correction codes, Boolean algebra, map simplification, logic gates; combinational circuits: half and full adders, multiplexers, decoders and encoders; sequential circuits: flip-flops, registers, counters; basic computer components and their function.

**UNIT-2 Principles Of Computer Design:**

Machine language instructions, Memory address structure, register organization, Instruction fields, instruction types, instruction set selection, Micro operations, Register transfer language, Instruction cycle and Interrupt cycle, Instruction formats and addressing modes.

**UNIT-3 CPU & Control Unit**

Stack, Instruction formats, Addressing Modes, Data Transfer, Data path and control path design, microprogrammed and hardwired control, RISC vs CISC, pipelining in CPU design, super scalar processors.

**UNIT-4 Computer Arithmetic & I/O Techniques:**

Addition, Subtraction, Multiplication and Division Algorithms, I/O addressing, Synchronization, I/O interfacing, Programmed I/O, Interrupt mechanism, DMA, I/O processors.

**UNIT-5 Memory System & Multiprocessor:**

Basic cell of static and dynamic RAM, building large memories using chips, memory array organization, memory hierarchy, memory interleaving, associative memory, cache memory organization, and virtual memory organization, cache coherence, interconnection structure, interprocessor arbitration communication and synchronization.

**Text Books:**

1. Computer System Architecture by Morris Mano (PHI 3<sup>rd</sup> edition)
2. Digital Computer Logic Design by Morris Mano (PHI)

**References:**

1. Computer organization and architecture by Willian Stallings (PHI)
2. Computer Organization and Architecture by J.P.Hayes (TMH)
3. Computer Architecture by Chaudhary, IIT-Kharagpur.

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1<sup>st</sup> Semester MCA Code : HS40115(CA)**

**PROFESSIONAL COMMUNICATION IN ENGLISH**

**UNIT-1**

Communication Process, Elements, Objectives, Principles, Barriers in communication, Communication in Organization. Note-taking from lectures and written materials: Listening - Introduction, Advantages and Importance, How to become a good listener, Barriers in effective listening.

**UNIT-2**

Written Presentation of Technical material and Preparation of Bibliography with special reference to technical reports, its structure and layout; Planning and Preparation; Use of Illustrations; Writing the Report, Formal and Informal Reports, Elements of letter writing and style of writing.

**UNIT-3**

Basics of Official Correspondence: Handling Correspondence, Receipt and Dispatch of Mails, Filing system, Classification of Mails; Quotation, Orders, Tenders, Sales Letters; Letter Writing - Principles, Structure and Lay out, Planning, Preparation of Resume, Advertising and Jobs Description.

**UNIT-4**

Precis Writing: Steps of Precis Writing, DOS and Don'ts of Precis Writing. Principle Planning, Preparation for Presentation; Meetings, Conferences, Interviews. Audio-Visual Communications, Telephonic Conversations.

**UNIT-5**

Seminars: Preparation, Presentation and Practice; Principles of Effective Oral Communication, Speech Preparation, Pronunciation, Voice Control, Physical Behaviour, Techniques of Effective Speech and Interpersonal Communication.

Group Discussion: Definition, Process, Characteristics and Formation of Groups, Do's and Don'ts, Helpful Expression and Evaluation.

**Text Books:**

1. Essentials of Effective Communication - Ludlow.R and Panton.F., Prentice Hall, India Pvt. Ltd., 1995.
2. Business Correspondence and Report Writing - RC Sharma and Krishna Mohan, Prentice Hall, India.

**Reference Books**

1. Essentials of Business Communication - Rajendra Pal and JS Kurlahalli, S.Chand & Sons, NewDelhi, 1999.
2. Developing Communication Skills - Krishna Mohan and Meera Banerjee, McMillan India Ltd. New Delhi, 2000.
3. Business Communication - Asha Kaul, Prentice Hall, India Pvt Ltd, New Delhi, 2000.
4. Professional Communication Skills - Alok Jain, P.S. Bhatia and A.M. Shiekh, S. Chand & Company Ltd., 2005.
5. Business Communication: Strategy and Skill - Prentice Hall, New Jersey, 1987.
6. Writing Technical Papers - DH Menzel, HM Jones& LGBoyd, McGraw Hill, 1961.
7. A Manual for Writers of Term Papers, Thesis and Dissertation - KL Turbian, University of Chicago Press, 1973.

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1st Semester MCA Code : CA40121(CA)**

**PROGRAMMING LAB IN C**

Programming exercises using C programming language. Concept of Exercises to study various features of the language. Stress to be laid on writing well structured modular and readable programs accompanied by good documentation.

**Programs should be made to cover the following areas:**

Use of various control structures such as if-then, if-then-else, while-do, do-while, for-loop, switch-case, goto, Practice on arrays one dimensional two dimensional arrays, Strings and its operation, matrices and its operation, multi dimensional arrays Concept and programs on structures and union, Concept of function, Parameter passing, call by value and reference, passing of arrays as parameter, strings, structure, Practice on pointers, malloc() calloc() functions Program related to file handling concept

**NIT SCHEME**  
**NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)**  
**Semester - 1st Semester MCA Code : CA40122(CA)**

**INFORMATION TECHNOLOGY LAB**

- \* Familiarizing with PC, MS DOS and MS WINDOWS commands.
- \* All the Internal and External commands of DOS.
- \* Learning to use Office Automation Tool
- \* MS WORD Complete word processing environment
- \* MS ACCESS concept of building up databases, developing queries, linking with front end tools
- \* MS Excel developing spread sheet and its manipulation
- \* PowerPoint presentation practice on developing a presentation
- \* Assembly Language Programming