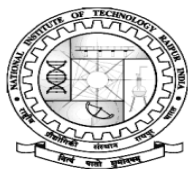# राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

National Institute of Technology Raipur											
Computer Application											
Course of Study and Scheme of Examination						MCA 1st Semester				Branch:CA	
S. No.	Subject Code	Subject Name	Periods per Week			TA	Examination Scheme				Total Marks	Credit
			L	T	P		MSE/MTR		ESE/ESVE			
							Theor	Prac.	Theory	Prac.		
1	CA401101CA	Operating System	3	1	0	20	30	–	50	–	100	4
2	MA401002MA	Computer Oriented Numerical Analysis	3	1	0	20	30	–	50	–	100	4
3	CA401103CA	Problem Solving and Programming	3	1	0	20	30	–	50	–	100	4
4	CA401104CA	Computer System Architecture	3	1	0	20	30	–	50	–	100	4
5	HS401005HS	Professional Communication in English	2	0	4	20	30	–	50	–	100	4
6	CA401401CA	Computer Lab-101	0	0	4	40	–	20	–	40	100	2
7	CA401402CA	Computer Lab-102	0	0	4	40	–	20	–	40	100	2
											24

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Semester I

1.	Department proposing the course	Department of Computer Applications
2.	Course Title	Operating System
3.	L-T-P Structure	3-1-0
4.	Credits / # of period	04/42
5.	Course number(Code)	
6.	Status (Core/Elective)	Core
7.	Pre-requisites(course no./title)	
8.	Frequency of offer	
9.	Course Objectives: 1. To provide information about need and function of operating system. 2. Make the student aware of different types of operating system. 3. Providing the concept of process, process scheduling, inter-process communication (IPC) and multithreading. 4. To make student familiar with the concept of memory management. 5. Explaining the notion of file, directory, disk, disk scheduling algorithms.	
10.	Course Syllabus: **Unit -1** **Introduction:** Definition, Design Goals, Evolution of Operating System: Batch Processing, Multi-programming, Real time, Timesharing, Android Operating System, Network Operating System Structure, Operating-System Function and Services; Distributed Operating System, System Calls, System Boot. **Unit -2** **Process Management:** Process States, Process Control Block, Schedulers, CPU Scheduling Algorithms, Inter Process Communication: need, Mutual Exclusion, Semaphore, classical problems in concurrent programming, Critical Section, Deadlock Characteristics, Prevention, Avoidance, Detection, and Recovery, Multithreading. **Unit -3** **Memory Management:** Logical and Physical Addresses, Address Binding, Dynamic Loading and Linking Concepts, Contiguous Allocation, Fragmentation, Paging, Segmentation, Virtual Memory, Demand Paging, Page Fault, Page Replacement Algorithms, Global vs Local Allocation, Thrashing. **Unit -4** **File and Secondary Storage Management:** Definition of File, File Attributes, File Types, File Access Methods, Directory Structure, File System Organization, Allocation Methods, Free Space Management; Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management.	

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

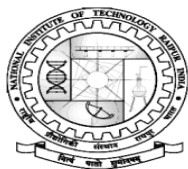|	
11.	**Text Books:** 1. Operating System Concepts by James L. Peterson, Abraham Silberschatz (Addison-Wesley) 2. Operating System Concepts &. Design by Milan Milenkovic (MGH)
12.	**Reference Books :** 1. Modern Operating System by Andrew .S. Tanenbaum (PHI) 2. An Introduction to Operating Systems by Haevey M Dietel(Addison V/esley)

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Semester I

1.	Department proposing the course	Department of Mathematics
2.	Course Title	Computer Oriented Numerical Analysis
3.	L-T-P Structure	3-1-0
4.	Credits / # of period	4/40
5.	Course number(Code)	CMA 12
6.	Status (Core/Elective)	Core
7.	Pre-requisites (course no./title)	Undergraduates Mathematics
8.	Frequency of offer	Regular

9.	**Course Objectives:**
	To enable the students to apply the knowledge of Mathematics in various fields:
	1. Introduce the method to solve the algebraic, transcendental and simultaneous linear equations and its application.
	2. Introduce the method to solve the problems related to data appear equal or unequal intervals and to obtain a functional relationship between the observed values.
	3. Introduce the method to calculate the derivative of the function and evaluate the definite Integral from set of numerical values.
	4. Introduce the method to solve the ordinary differential equations using different numerical techniques.

10.	**Course Syllabus:**
	Unit - 1: - Numerical Solutions of Algebraic & Transcendental Equations
	Errors in numerical computation, Error type, Bisection Method, Regula – Falsi Method, Secant Method, Newton-Raphson Method with algorithms.
	Unit - 2: - Numerical Solutions of Simultaneous Linear and Non-linear Equations
	Direct Methods - Gauss Elimination, Gauss-Jordan & Crout's Triangularisation Method, Iterative Methods -Jacobi's, Gauss- Siedal & Relaxation Methods with algorithms, Newton-Raphson Method for Non-linear Simultaneous Equations.
	Unit - 3: - Interpolation, Numerical Differentiation & Integration
	Finite differences, Forward, Backward & Central Difference Interpolation, Lagrange's Interpolation and Newton's Divided Difference Interpolation, Derivatives using Forward, Backward and Central Difference Formulae, Newton-Cote's Quadrature Formula, Trapezoidal rule, Simpson's rules, Weddle's rule.
	Unit - 4: - Numerical Solution of Ordinary Differential Equations
	Numerical solution of ODE by Picard's Method, Taylor's Series Method, Euler's Modified Method, Runge-Kutta Method of Fourth Order, Milne's Method, Adams – Bashforth Method.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

(Institute of National Importance)

G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

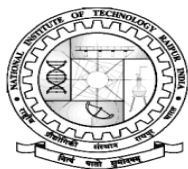| 11.	**Text Books:**
	1. M. K. Jain, S. R. K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Limited, Publisher. **2.** S. S. Sastry, Introductory Methods of Numerical Analysis, PHI, Publication. **3.** S. C. Chapra & R. P. Canale, Numerical Methods for Engineers, MacGraw Hill Education (India) Pvt.
12.	**Reference Books :**
	1. P. Kandasamy, K. Thilagavathy, & K. Gunavathi, Numerical Methods, S. Chand & Company. **2.** E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons. **3.** B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Semester- I

1.	Department proposing the course	Department of Computer Applications
2.	Course Title	Problem Solving & Programming
3.	L-T-P Structure	3-1-0
4.	Credits / # of period	04/42
5.	Course number(Code)	
6.	Status (Core/Elective)	Core
7.	Pre-requisites(course no./title)	
8.	Frequency of offer	
9.	Course Objectives: 1. To inculcate problem solving abilities in the students. 2. To understand and solve the problem using C-Programming. 3. To explain the concepts of arrays, pointers, user defined data-types, file handling and memory management. 4. To prepare the students for advanced programming challenges.	
10.	**Course Syllabus:** **Unit-1** **Introduction to 'C' Language and Problem Solving Methods:** Algorithms and Flowcharts, Top-Down and Bottom-Up Approaches, Compilation Process, Basic Constructs of C, Storage Classes, Operators, Control Structures: Branching, Looping, Library Functions, User Defined Functions, Recursion. **Unit-2** **Array**: Declaration and Initialization of nD array, Traversing and Manipulation in Arrays, Searching and Sorting in Array, Passing Array to Function, Pointers: Declarations and Initialization, Pointer Arithmetic, Pointers of Arrays, Array of Pointers. Strings in C, Operations, Strings Library Functions. **Unit-3** **C-Preprocessor Directives**, **User Defined Data Types:** Structure, Union, Enum with Examples, Dynamic Memory Allocation, File handling. **Unit-4** **Basics of Object Oriented Programming**: Procedure vs Object Oriented concepts. Introduction to Web Programming: HTML, Javascript, XML, CSS, Introduction to JSON, AJAX	

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

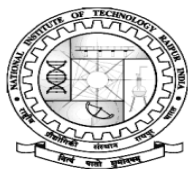| 11.	**Text Books:**
	1. The C Programming Language by Kernighan and Ritchie, Prentice Hall. 2. The C puzzle book Book by Alan R. Feuer 3. Expert C Programming Book by Peter van der Linden
12.	**Reference Books :**
	1. Let Us C by Yashavant Kanetkar 2. Problem solving with C / Jacqueline A. Jones & Keith Harrow. 3. How to solve the problem, Dromey

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

(Institute of National Importance)

G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Semester I

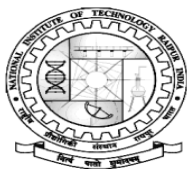| 1.	Department proposing the course	Department of Computer Applications
2.	Course Title	Computer System Architecture
3.	L-T-P Structure	3-1-0
4.	Credits / # of period	04/42
5.	Course number(Code)	
6.	Status (Core/Elective)	Core
7.	Pre-requisites (course no./title)	
8.	Frequency of offer	
9.	Course Objectives: 1. To understand the basic structure of a digital computer. 2. To be familiar with the operations of internal components. 3. To analyze architectures and computational designs.	
10.	Course Syllabus: **UNIT-1** **Basic functional blocks of a computer:** CPU, Memory, Input/ Output Subsystems, Control Unit. Instruction Set Architecture of a CPU Registers, Instruction Execution Cycle, RTL Interpretation of Instructions, Addressing Modes, Instruction Sets. **UNIT-2** **Data Representation and Digital Components:** Signed Number System Representation, Fixed and Floating Point Representations, Character Representation. Boolean Algebra, Map Simplification, Logic Gates; Combinational Circuits: Half And Full Adders, Multiplexers, Decoders and Encoders; Sequential Circuits: Flip-Flops, Registers. **UNIT-3** **CPU Control Unit Design and Computer Arithmetic:** Hardwired and Micro-Programmed Design Approaches. Case Study-Design of a Simple Hypothetical CPU. Addition, Subtraction, Multiplication and Division Algorithms, I/O Addressing, Synchronization, I/O Interfacing, Programmed I/O, Interrupt Mechanism, DMA, I/O Processors. **UNIT-4** **Memory System and Performance Enhancement Techniques:** Pipelining: Basic Concepts of Pipelining, Throughput and Speedup, Pipelining Hazards. Memory Organization: Memory Interleaving, Concept of Hierarchical Memory Organization, Cache Memory, Cache Size vs Block Size, Mapping Functions, Replacement Algorithms, Write Policy.	

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

(Institute of National Importance)

G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

11.	**Text Books:**
	1. Computer System Architecture by Morris Mano (PHI 3rdedition) 2. Computer organization and Design,4th Ed., D.A.Patterson and J.L.Hennessy
12.	**Reference Books:**
	1. Computer organization and architecture by Willian Stallings (PHI) 2. Computer Organization and Architecture by J.P.Hayes (TMH) 3. Computer Architecture by Berhooz Parhami

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Semester I

1.	Department proposing the course	Department of Humanities and Social Science
2.	Course Title	Professional Communications in English
3.	L-T-P Structure	2-0-4
4.	Credits / # of period	04/02
5.	Course number(Code)	
6.	Status (Core/Elective)	Essential Program Requirement
7.	Pre-requisites (course no./title)	None
8.	Frequency of offer	First Year(First Semester)
9.	Course Objectives: 1. *To formulate English sentences and avoid common errors.* 2. To develop listening & writing skills. 3. To use English in professional communication.	

10.	Course Syllabus:
	
	UNIT-1
	
	Interpersonal Communication
	    1.1 Communication: elements, types and channels.
	    1.2 Media of Communication: Verbal and Non-Verbal.
	    1.3 Barriers to communication and its solution.
	    1.4 Soft skills and negotiation.
	
	UNIT-2
	
	Functional Grammar
	    2.1 Different types of parts of speech.
	    2.2 Sentence structure and par jumbles.
	    2.3 Error correction.
	    2.4 Vocabulary building- anatomy, synonym, substitution.
	
	UNIT-3
	
	Speaking and reading
	    3.1 Different types reading: note taking and paraphrasing.
	    3.2 Comprehension passage.
	    3.3 Group discussion strategies: techniques for individual contribution in GD: topic analysis.
	    3.4 Formal presentation-planning and organizing.	

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 22 54 200
Fax: (0771) 22 54 600
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

	UNIT-4
	
	Different forms of writing module
	    4.1 Resume and cover letter.
	    4.2 Abstract, executive summary, mini project proposal
	    4.3 Short essay writing and case study.
	    4.4 Business/ official correspondence.

11.	**Text Books:** 3. Practical English Usage, Michael Swan ,OUP 1995. 4. Remedial English grammar.F.T. Wood Macmillan 2007 5. Communication Skills .Sanjay Kumar and Pushp Lata.Oxford University press 2011 6. Oxford Guide to Effective Writing and Speaking John Seely. Oxford University Press 2013
12.	**Reference Books:** 4. English Vocabulary in Use(Intermediate) Michael McCarthy & Felicity O`Dell, 2002 5. A Comprehensive Grammar of the English Language R Quirk Person Education India 2010. 6. The Handbook of communication Skills. Owen Hargie,routledge 2003

Computer Lab-101 (Operating System Lab Assignments)

1. Perform basic UNIX commands (ls, mv, emacs, chmod, chown etc.).

2. Use Shell Script:

   a) Print hello world 100 times using loop.

   b) Get Principal Amount, Rate and Time as User Inputs and Calculate Simple Interest

   c) Demonstrate Case condition.

   d) Create a function that takes 2 number as parameters and find prime number between them.

   e) Perform file related operations (read, write, append).

3. Implement of Process related problems

4. Implement of File related problems.

5. Implement of Memory Management related problems.

Reference:

1. UNIX concepts and applications, Fourth Edition, Sumitabha Das, TMH.
2. UNIX and shell Programming, B.A. Forouzan & R.F. Giberg, Thomson.
3. Beginning shell scripting, E. Foster, Johnson & other, Wile Y- India

Computer Lab – 102 (Problem Solving and Programming Lab Assignments)

1. Generate different patterns using numbers, symbols and alphabets.

2. Perform basic arithmetic operations (LCM, GCD, Check Prime Number, Armstrong Number, Factorial using Recursion, Prime factors, Radix Conversion, Palindrome).

3. Perform arithmetic operations on Arrays (Addition, Subtraction, Multiplication, Transpose, Inverse, Sum of Diagonal elements).

4. Perform Bubble Sort, Selection Sort, and Binary Search Operation on Array.

5. Create a single program to perform different tasks (reverse the string, count the number of characters in string, copy the one string to other string, count no. of vowels, consonants in each word of a sentence and no. of punctuation in sentence, arrange the alphabets of a string in ascending order.) using switch, if else, loop and single dimension character array without using library function.

6. Generate different series (Fibonacci series, Triangular, Pentagonal and Hexagonal number Series, The Lazy Caterer's Sequence, Sine, Cosine, Log, and Tangent series).

7. Draw the flowchart and Write C Program to compute Sin(x) using Taylor series approximation given by Sin(x) = x - (x3/3!) + (x5/5!) - (x7/7!) + ……. Compare the result with the built- in Library function and print both the results with appropriate messages.

8. Perform operation on string using pointers and library functions.

9. Solve Trigonometry and Geometry related problems.

10. Define Macros to perform arithmetic operations.

11. Create your own header file and include it in your main file.

12. Implement a program using structure and union.

13. Implement a program using enum.

14. Given a sentence, return the positions of a keyword and replace it by another word only if it forms a complete word.

15. Implement dynamic Array using calloc(), malloc(), realloc() and free();

16. Implement file handling program to create, read, write and append simple text.

17. Copy content of an existing file to a new file.

18. Implement Recursion Problem, Hash Function.

19. Implement Some Problem from Numerical Analysis.

20. 20.Design a webpage containing Name, Mobile No., Email, Password, Confirm password an Validate using JavaScript.