

**RAJEEV GANDHI GOVT. PG COLLEGE
AMBIKAPUR CHHATTISGARH
DEPARTMENT OF COMPUTER SCIENCE**



SYLLABUS

As per the Choice Based Credit System (CBCS)

Designed in accordance with

Learning Outcomes-Based Curriculum Framework

of National Education Policy (NEP) 2020

For

FOUR YEAR UNDERGRADUATE PROGRAMME

IN

COMPUTER SCIENCE

2023-2024

RAJEEV GANDHI GOVT. PG COLLEGE AMBIKAPUR (C.G.)

Department of Computer Science

Members of Board of Studies






S.No	Name	Role	Signature
1.	Miss Monika Xess, Assistant Professor & Head, Department of Computer Science, Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Chairman	
2.	Dr. Srishti Tripathi, Assistant Professor Kirodimal Govt. Arts & Science College, Raigarh (C.G.)	Member	
3.	Dr. Ganesh Ram Nayak, Assistant Professor Govt. Dr. Waman Wasudev Patankar Girl's PG College Durg (C.G.)	Member	
4.	Mrs. Pooja Mishra, Assistant Professor (Janbhagidari), Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Member	
5.	Miss Rani Chourasia, Assistant Professor (Janbhagidari), Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Member	
6.	Mr. Raunak Pandey, Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Student Member	

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RAJEEV GANDHI GOVT. PG COLLEGE AMBIKAPUR (C.G.)

Department of Computer Science

VISION

The vision of the Computer Science Department is to generate competent professionals with the ability to solve problems, individually and in teams at local and national levels. Excel in the emerging areas of computer science by imparting knowledge, scholarly activity, creative endeavors and public service.

MISSION

- To provide strong fundamental and technical skills for computer science through effective teaching learning methodologies.
- To uplift innovative research in Computer Science for sustainable development of the Country's IT industry, Society and Government needs.
- To transform lives of the students by nurturing ethical values, creativity and commitment to lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO1	Students will create and collaborate in emergent computing technologies leading to innovative solutions for industry and academia.
PEO2	Develop strong skills in systematic planning, developing algorithms and providing solutions for computer based systems which helps in employability.
PEO3	To impart the need for consistent learning, importance of research & development for the welfare of the society and to the nation at large.
PEO4	Students will focus on team spirit, leadership, communication, ethics and social values, which will lead to apply knowledge of societal impacts of computing technologies.

PROGRAM OUTCOMES (POs)	
PO1	Discipline knowledge: Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity.
PO2	Problem Solving: Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
PO3	Design and Development of Solutions: Ability to design and development of algorithmic solutions to real world problems and acquiring a minimum knowledge on statistics and optimization problems. Establishing excellent skills in applying various design strategies for solving complex problems
PO4	Programming a Computer: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day applications with through knowledge on programming languages of various levels.
PO5	Application Systems Knowledge: Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.
PO6	Modern Tool Usage: Identify, select and use a modern scientific and IT tool or technique for modeling, prediction, data analysis and solving problems in the area of Computer Science and making them mobile based application software.
PO7	Industry Familiar: Student will be able to become industry familiar.
PO8	Project Management: Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.
PO9	Ethics on Profession, Environment and Society: Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
PO10	Motivation to take up Higher Studies: Inspiration to continue educations towards advanced studies on Computer Science.

GRADUATE ATTRIBUTES (GA) IN COMPUTER SCIENCE

GA1	Ability to identify a problem, analyzes using design thinking techniques, and evolves innovative approaches for solving it.
GA2	Ability to apply mathematical concepts and techniques in problem solving.
GA3	Ability to function effectively in multicultural teams to accomplish a common goal.
GA4	Ability to self-learn and engage in life-long learning and upgrade technical skills.
GA5	An understanding of professional and ethical responsibility.
GA6	Ability to undertake small research tasks and projects.
GA7	Exposure to emerging technologies such as DSA, Programming language, Cloud Technology etc.
GA8	Understanding of computing systems at computer architecture, operating systems, and distributed computing levels, and how they affect the performance of software applications.
GA9	Ability to design and apply appropriate algorithms and data structures for evolving efficient computing based solutions for new problems.
GA10	Understanding of theoretical foundations, fundamental principles, and limits of computing

PROGRAM SPECIFIC OUTCOMES (PSOs)

After successful completion of B.Sc. Computer Science program, the students will be able to:

PSO1	Apply fundamental knowledge of theoretical computer science and critically analyze problems to provide computer based solutions for various applications.
PSO2	Design cost effective hardware/software systems using the knowledge of hardware and/or software architecture, programming and development.
PSO3	To Demonstrate skills to use modern tools, software and equipment for problem solving in new and emerging disciplines.
PSO4	Apply domain knowledge and expertise for enhancing research capability to transform innovative ideas into reality.

PROGRAM LEARNING OUTCOMES (PLOs) for B.Sc. in COMPUTER SCIENCE	
PLO-1	Problem Analysis and solutions: Think critically, identify, analyze problems/situations and further attempt to design/develop solutions that meet the specified goals.
PLO-2	Use of Technology: Apply appropriate IT tools efficiently in their daily life-professional and personal.
PLO-3	Environment and Sustainability: Be aware of environmental issues and commit towards sustainable development at local/national and global context.
PLO-4	Ethics: Recognize and understand professional ethics/human values and be responsible.
PLO-5	Individual and Team work: Function effectively at various levels, capacities and situations.
PLO-6	Communication: Communicate proficiently (oral and written) as a responsible member of society.
PLO-7	Research Aptitude: Understand general research methods and be able to analyze, interpret and derive rational conclusions.
PLO-8	Life Skills: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change.

QUALIFICATION DESCRIPTORS FOR GRADUATES B.Sc. COMPUTER SCIENCE	
QD-1	Demonstrate coherent knowledge and understanding of the logical organization of a digital computer, its components and working. Understanding of the time and space complexities of algorithms designed to solve computational problems.
QD-2	Demonstrate programming skills in high level language and an ability to learn a new programming language without substantial effort.
QD-3	Apply knowledge of logical skills to identify and analyze problems and issues, and seek solutions to real-life problems. For example, creating mobile applications, database applications, and educative computer games.
QD-4	Enhanced communication and leadership abilities and ability to work and learn in team environment.

SEMESTER-WISE DISTRIBUTION OF COURSES

SEMESTER	COURSE TYPE	COURSE TITLE	CREDIT
I	DSC	Introductory Computer Science	3
	DSC Practical	Introductory Computer Science Lab	1
	GE	Basics of Computer Science	3
	GE Practical	Basics of Computer Science Lab	1
	VAC	Cyber Crime & Security-I	2
II	DSC	Programming in C	3
	DSC Practical	Programming in C Lab	1
	GE	Basics of Networking & Communication Technologies	3
	GE Practical	Basics of Networking & Communication Technologies Lab	1
	VAC	Cyber Crime & Security-II	2
III	DSC	Data Structures	3
	DSC Practical	Data Structures Lab	1
	DSE	Fundamentals of Digital Logic	3
	DSE Practical	Fundamentals of Digital Logic Lab	1
IV	DSC	Object Oriented Programming using C++	3
	DSC Practical	Object Oriented Programming using C++ Lab	1
	DSE	Operating System	3
	DSE Practical	Operating System Lab	1
V	DSC	Programming In Java	3
	DSC Practical	Programming In Java Lab	1
	DSE	Software Engineering	3
	DSE Practical	Software Engineering Lab	1
	GE	Multimedia & its Applications	3
	GE Practical	Multimedia & its Applications Lab	1
VI	DSC	Database Management System	3
	DSC Practical	Database Management System Lab	1
	DSE	Computer Networks	3
	DSE Practical	Computer Networks Lab	1
	GE	Fundamental Concepts of Programming	3
	GE Practical	Fundamental Concepts of Programming Lab	1

AFTER DEGREE IN B.Sc. COMPUTER SCIENCE WITH MINIMUM 7.5 CGPA			
VII	DSC	Python Programming	3
	DSC Practical	Python Programming Lab	1
	DSE	Internet & Web Technology	3
	DSE Practical	Internet & Web Technology Lab	1
	DSE	Computer Organization & Architecture	4
	DSE	Data Mining	4
	Dissertation		4+2
VIII	DSC	Design & Analysis of Algorithm	3
	DSC Practical	Design & Analysis of Algorithm Lab	1
	DSE	Information Security & Cryptography	3
	DSE Practical	Information Security & Cryptography Lab	1
	DSE	Artificial Intelligence	4
	DSE	System Programming	4
	Dissertation		4+2

<i>S.N</i>	<i>COURSE NAME (as per UGC)</i>	<i>COURSE CODE (as per UGC)</i>	<i>CODE (as in scheme)</i>	<i>CREDIT</i>
1.	<i>Discipline Specific Core Course</i>	<i>DSC</i>	<i>DSCC</i>	<i>4</i>
2.	<i>Discipline Specific Elective Course</i>	<i>DSE</i>	<i>DSEC</i>	<i>4</i>
3.	<i>Generic Elective Course</i>	<i>GE</i>	<i>GEC</i>	<i>4</i>
4.	<i>Ability Enhancement Course</i>	<i>AEC</i>	<i>AEC</i>	<i>2</i>
5.	<i>Skill Enhancement Course</i>	<i>SEC</i>	<i>SEC</i>	<i>2</i>
6.	<i>Value Addition Course</i>	<i>VAC</i>	<i>VAC</i>	<i>2</i>

Discipline Specific Core Course (DSC) Papers: (Credit: 04 each)

1. DSC CS01 Introductory Computer Science
2. DSC CS02 Programming In C
3. DSC CS03 Data Structures
4. DSC CS04 Object Oriented Programming using C++
5. DSC CS05 Programming In Java
6. DSC CS06 Database Management System
7. DSC CS07 Python Programming
8. DSC CS08 Design & Analysis of Algorithm

**Discipline Specific Elective Papers: (Credit: 04 each)
(DSE-1, DSE-2, DSE-3, DSE-4, DSE-5, DSE-6)**

DSE-1 (Choose any one)

- a) Fundamentals of Digital Logic
- b) Theory of Computation

DSE-2 (Choose any one)

- a) Microprocessor
- b) Operating System

DSE-3 (Choose any one)

- a) Software Engineering
- b) Computer Graphics

DSE-4 (Choose any one)

- a) Digital Image Processing
- b) Computer Networks

DSE-5 (Choose any three)

- a) Data Analysis and Visualization
- b) Data Mining
- c) Computer Organization & Architecture
- d) Internet & Web Technology

DSE-6 (Choose any three)

- a) Artificial Intelligence
- b) Information Security & Cryptography
- c) Deep Learning
- d) System Programming

Generic Elective Course (GE) Papers: (Credit: 04 each)

1. GE CS01 Basics of Computer Science
2. GE CS02 Basics of Networking & Communication Technologies
3. GE CS05 Multimedia & its Applications
4. GE CS06 Fundamental Concepts of Programming

Value Addition Course (VAC) Papers: (Credit: 02 each)

1. VAC CS01 Cyber Crime & Security-I
2. VAC CS02 Cyber Crime & Security-II

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc DEPARTMENT OF COMPUTER SCIENCE FIRST SEMESTER (Marks Scheme)

Sl. No.	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theory	Practical	Max	Min	Max	Min	Max	Min	Max	Min
1	Introductory Computer Science	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Basics of Computer Science	Generic Elective Course (GEC)	03	01	60	24	15	-	25	10	100	40
3	Cyber Crime & Security-I	Value Addition Course(VAC)	02	00	40	16	10	-	-	-	50	20
Total			8								250	

SEMESTER	DSCC	DSEC	GEC	AEC	SEC	IIP /ATP /PT	VAC	Total Credit
FIRST	A.DSCC-1(4) B.DSCC -1(4) C.DSCC -1(4)	XX	GEC-1(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i>	XX	VAC(2) <i>Choose from a Pool</i>	22 Credit
SECOND	A.DSCC-2(4) B.DSCC -2(4) C.DSCC -2(4)	XX	GEC-2(4) <i>Choose from a Pool</i>	AEC(2) Choose from a Pool	SEC(2) Choose from a Pool	XX	VAC(2) <i>Choose from a Pool</i>	22 Credit

Students on exit shall be awarded Undergraduate Certificate (in field of Multidisciplinary study) after securing the 44 requisite credits in semester I & II with additional 10 credits (credit 6 essential of job course).

B.Sc. Semester-I

DSC CS01- Introductory Computer Science

COURSE OBJECTIVES:

- Familiarize with the fundamentals of Computer System.
- Understand the key concepts of computer languages, computer network and types of software.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Acquire knowledge of basic computer technology.

CO2: Gain Knowledge about H/w and S/w Concepts with its technology areas.

CO3: Understand the basics of programming languages.

CO4: Analyze & learning with C-Programming & its basic terminology.

CO5: Design & Analyze the basic terminology of network, communications etc.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓				✓		✓		✓	✓
CO3	✓								✓	
CO4	✓	✓		✓			✓		✓	✓
CO5	✓	✓	✓		✓		✓			✓

B.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: DSC CS01 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: INTRODUCTORY COMPUTER SCIENCE	
CREDIT: 4(3T + 1P)	HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)
UNIT-1 10Hrs	BASICS OF COMPUTER: Definition, Basic Applications of Computer, Generation of Computer, Classification of Computers, Block diagram of computer and its components, Input-Output devices, Storage devices (Primary and Secondary), Keyboard shortcuts.
UNIT-2 12Hrs	SOFTWARE AND COMPUTER NETWORK CONCEPTS: Types of Software- system software, application software, utility software, and firmware. Components of data communication system, Transmission Media (guided and unguided), Types of network (LAN, MAN, WAN), Network topologies (mesh, star, ring, bus).
UNIT-3 11Hrs	INTRODUCTION TO COMPUTER LANGUAGE: Generations and types of programming language (Low level, Assembly & High level), Programming Paradigms (procedural and object oriented programming), Language translators- Assembler, Interpreter, Compiler. Algorithms-definition, characteristics, Flow Chart- definition, symbols used, writing an algorithm and creating flow chart of simple problems.
UNIT-4 12Hrs	GUI BASED OPERATING SYSTEM-WINDOWS 7 : Installing WINDOWS, Basic Elements of WINDOWS, My Computer, Sharing Devices. Windows Explorer (Files and Folder Operations), Accessories like Accessibility, Entertainment, Communication, System Tools, Paint Brush, Calculator, Calendar, Clock, Note Pad, Word Pad Etc., Control Panel, Changing Color and Theme, Changing the Desktop Background, Screen Saver, Adjusting Display Settings, Adjusting Sound, Adjusting the Mouse, Changing the Date and Time, Changing Language and Region Options, Customizing Folder View Options, Connecting to the Internet: Dial-Up Connections, Broadband Connections, Installing New Hardware & Printer, Installing & Removing Software, Power Settings.
SUGGESTED READINGS	Books: <ol style="list-style-type: none"> 1. Fundamentals of Computer by V Raja Raman. 2. Computer Fundamental by PK Sinha. 3. Programming in ANSI C- by E. Balagurusamy-Tata McGraw Hill.

B.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)		
COURSE CODE: DSC CSP01 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: INTRODUCTORY COMPUTER SCIENCE LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Practical's based on MS word features and functions. 2. Practical's based on MS Power Point features and functions. 3. Practical's based on MS Excel formulas and functions. 4. Practical's based on MS Access concepts. 5. Practical on Internet basics. 	

Semester-I

GE CS01- Basics of Computer Science

COURSE OBJECTIVES:

- Gain an understanding of the fundamental concepts of computer science.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Acquire knowledge of basic computer Technology.

CO2: Gain Knowledge about hardware and software concepts.

CO3: Understand the working of various application software.

CO4: Understand the working of Language translators.

CO5: Design & Analyze the basic terminology of network, Internet, communications etc.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓				✓		✓		✓	✓
CO3	✓								✓	
CO4	✓	✓		✓			✓		✓	✓
CO5	✓	✓	✓		✓		✓			✓

DEPARTMENT OF COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: GE CS01 COURSE TYPE: GENERIC ELECTIVE COURSE	
COURSE TITLE: BASICS OF COMPUTER SCIENCE	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	Introduction To Computers: Definition, Basic Applications of Computer, Organization of computer system, Generation of computers, Classification of Computers.
UNIT-2 12Hrs	Memories and Computer Peripheral: Types of memory (Primary and Secondary), Peripherals (Input and Output devices). Language Translator and User Interface: Interpreter, Compiler, Assembler, Operating System- definition, functions and types, (eg. LINUX, WINDOWS).
UNIT-3 11Hrs	MS-Word: Overview of Word Processing, Parts of word window, Types of Menus, Opening, creating, saving, cut, copy and paste, print and print preview. Find and Replace, Header & Footer, save & save As, Borders and shading, Bullets & Numbering, spelling and Grammar, Word count, Mail Merge, Table handling, Macros.
UNIT-4 12Hrs	MS-PowerPoint: Overview of MS-PowerPoint, Slides, PowerPoint views, Auto content wizard, Custom Animation, Transition and build effects, Printing slides and important shortcut keys.
SUGGESTED READINGS	<p>Books</p> <ol style="list-style-type: none"> 1. Goel, A. (2010). Computer Fundamentals, Pearson Education. 2. Aksoy, P. & Nardis, L. De. (2006), Introduction to Information Technology, Cengage Learning. 3. Sinha, P. K. (2007), Fundamentals of Computers, BPB Publishers.

DEPARTMENT OF COMPUTER SCIENCE (FIRST SEMESTER)		
COURSE CODE:GE CSP01 COURSE TYPE : GENERIC ELECTIVE COURSE		
COURSE TITLE: BASICS OF COMPUTER SCIENCE LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Practice page setup and paragraph formatting in MS Word. 2. Practice concept of header, footer in MS Word. 3. Practice spelling & grammar check options in Word. 4. Practice table creation in MS Word. 5. Create an organization chart in MS Word using Smart Art. 6. Insert equations and different symbols in MS Word. 7. Practice different Watermark options in MS Word. 8. Insert chart to illustrate and compare data. 9. Create your own Bio-data in MS Word. 10. Practice concept of mail merge in MS-Word. 	

Semester-I

VAC CS01- Cyber Crime & Security-I

COURSE OBJECTIVES:

- Identify the key concepts, roles and domains of Cyber Security.
- Identify the key components of securing networks, systems and applications and data.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Develop a deeper understanding for various types of cyber attacks, cyber crimes, vulnerabilities and remedies thereto.

CO2: Analyze and evaluate existing legal framework and laws on cyber security.

CO3: Analyze and evaluate the importance of personal data its privacy and security.

CO4: Analyze and evaluate the cyber security risks.

CO5: Able to take measures for self-cyber-protection as well as societal cyber-protection.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓	✓		✓		✓
CO2	✓	✓					✓		✓	✓
CO3	✓	✓	✓				✓		✓	✓
CO4	✓	✓	✓	✓			✓		✓	✓
CO5		✓		✓				✓	✓	

DEPARTMENT OF COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: VAC CS01 COURSE TYPE: VALUE ADDITION COURSE	
COURSE TITLE: CYBER CRIME & SECURITY-I	
CREDIT: 2	HOURS: 30 MARKS: 50
UNIT-1 15Hrs	<p>Cyber Crime- definition, Reasons for Commission of Cyber Crimes ,Types of Cyber Crime: (i) Computer Hacking (Spoofing, Phishing, Web Jacking) (ii) Cyber Trolls and Bullying (iii) Cyber Stalking (iv)Online Scams (v)Software Piracy& Illegal Downloads (vi)Data theft &Identity theft (vii) Child Pornography(viii)Logic Bomb.</p> <p>Cyber law: Legal perspective of cyber crime, IT Act 2000 and its amendments, Organizations dealing with Cyber crime and Cyber security in India, Case studies.</p>
UNIT-2 15Hrs	<p>Introduction to Cyber Security: Defining Cyberspace, Architecture of cyberspace, Communication and web technology, Internet, WWW, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security, types and techniques of cyber security.</p> <p>Cyber Security tools example: Firewall, Antivirus software.</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. The Psychology of Information Security by Ieronzina Tullin. 2. The Information Technology Act, 2000; Bare Act – Professional Book Publishers, New Delhi 3. Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd. 4. Cyber Law in India by Farooq Ahmad; Pioneer Books. 5. Cyber Law & Cyber Crimes By Advocat Prashant Mali; Snow White publications, Mumbai

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc DEPARTMENT OF COMPUTER SCIENCE SECOND SEMESTER (Marks Scheme)

SL. No.	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theory	Practical	Max	Min	Max	Min	Max	Min	Max	Min
1	Programming in C	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Basics of Networking & Communication Technologies	Generic Elective Course (GEC)	03	01	60	24	15	-	25	10	100	40
3	Cyber Crime & Security-II	Value Addition Course(VAC)	02	00	40	16	10	-	-	-	50	20
Total			8								250	

SEMESTER	DSCC	DSEC	GEC	AEC	SEC	ITP /ATP /PT	VAC	Total Credit
FIRST	A.DSCC-1(4) B.DSCC -1(4) C.DSCC -1(4)	XX	GEC-1(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i>	XX	VAC(2) <i>Choose from a Pool</i>	22 Credit
SECOND	A.DSCC-2(4) B.DSCC -2(4) C.DSCC -2(4)	XX	GEC-2(4) <i>Choose from a Pool</i>	AEC(2) Choose from a Pool	SEC(2) Choose from a Pool	XX	VAC(2) <i>Choose from a Pool</i>	22 Credit

Students on exit shall be awarded Undergraduate Certificate (in field of Multidisciplinary study) after securing the 44 requisite credits in semester I & II with additional 10 credits (credit 6 essential of job course).

B.Sc. Semester-II

DSC CS02- Programming in C

COURSE OBJECTIVES:

- Gain an understanding of the basic structure of C programming languages like data types, control structures.
- To understand basic principles of structured programming using C.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Understand the basics of programming languages.

CO2: Analyze & learning with C-Programming & its basic terminology.

CO3: Read, understand and trace the execution of programs written in C language.

CO4: Understand the implementation of Control Structure.

CO5: Understand the importance of Array, Functions, Pointer and String and File Handling.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓				✓	
CO2	✓				✓				✓	✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓	✓	✓	✓		✓				✓
CO5	✓	✓				✓	✓			✓

B.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: DSC CS02 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: PROGRAMMING IN C	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	Basics of C Language : Introduction, History of C, Structure of C program, Tokens, constants, variables, data types, operators and expressions, Input/output, Decision Control Statements – (if, if-else, switch, break and continue, goto), Loop Control Statements- (for, while, do while) .
UNIT-2 12Hrs	Functions and String : Functions: Definition, User defined Functions, Categories of functions, Call by Value and Call by reference, Recursive function, and storage class. String: String declaration, initialization, string functions.
UNIT-3 11Hrs	Array and Pointer : Array: Array definition/declaration, One-D, Two-D and Multidimensional array. Pointer: Definition/Declaration, using * and & operator, Dynamic memory allocation functions- malloc, calloc, realloc and free, Pointer Vs Array.
UNIT-4 12Hrs	Structure, Union & File Handling : Structure: Introduction, declaring structure and structure variable, typedef statement. Union: Introduction, declaring Union, structure Vs. union, Enum. File Handling: Concept of File, File Accessing function: fopen(), fclose(), fprintf(), fscanf(), fputc(), fgetc(), fseek(), fread(), fwrite(), fflush(), rewind(), ferrror().
SUGGESTED READINGS	Books: 1. Programming in C “ YashwantKanetkar”. BPB Publications.Tenth Edition. 2. Programming in ANSI C- by E.Balagurusamy-Tata McGraw Hill. 3. The C Programming Language “Kemigham and Ritche[Prentice Hall]”.

B.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)		
COURSE CODE: DSC CSP02 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: PROGRAMMING IN C LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Write a C program to find largest number among three numbers. 2. Write a C program to check whether the given number is even or odd. 3. Write a C program to calculate area and circumference of a circle. 4. Write a C program for arithmetic operations using switch statement. 5. Write a C program to display Fibonacci series using for loop. 6. Write a C program to find sum of first n natural numbers using while loop. 7. Write a C program to swap two numbers with and without using temporary variable. 8. Write a C program to find the size of data types in C. 9. Write a C program to find ASCII value of a character. 10. Write C programs to print pyramids and patterns. 11. Write C program's to demonstrate Array. 12. Write C program's to demonstrate Pointer. 13. Write C program's to demonstrate String. 14. Write C program's to demonstrate functions. 15. Write C program's to demonstrate Structure and Union. 16. Write C program's to demonstrate File Handling concepts. 	

Semester-II

GE CS02- Basics of Networking & Communication Technologies

COURSE OBJECTIVES:

- To acquire learning of fundamental concepts of data communication and computer networks organization and implementation.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Acquire basic knowledge of computer networks & its terminology.

CO2: Gain Knowledge about LAN, MAN, WAN.

CO3: Analyze & learning with internet, intranet, extranet & its basic terminology.

CO4: Understand the importance of transmission media.

CO5: Understand the working of Network protocols and Networking devices.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓		✓		✓		✓			✓
CO3	✓	✓	✓			✓	✓		✓	✓
CO4	✓					✓	✓			✓
CO5	✓	✓			✓		✓		✓	✓

DEPARTMENT OF COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: GE CS02 COURSE TYPE: GENERIC ELECTIVE COURSE	
COURSE TITLE: BASICS OF NETWORKING & COMMUNICATION TECHNOLOGIES	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	<p>Evolution of Networking: ARPANET, Internet, Interspace.</p> <p>Terminology of Networks: Nodes, Server, Network Interface Unit (NIU).</p> <p>Switching Techniques: Circuit, Message and Packet switching.</p>
UNIT-2 12Hrs	<p>Data Communication Terminologies: Data Channel, Bandwidth (Hz, kHz, MHz), Data transfer rate (bps, kbps, Mbps, Gbps).</p> <p>Transmission Media: Guided media and Unguided media.</p>
UNIT-3 11Hrs	<p>Networking Devices: Modem, RJ45-connector, Repeater, Hub, Switch, Bridge, Router, and Gateway.</p> <p>Network Protocols: What is protocol? Types- TCP/IP, HTTP, FTP, SLIP/PPP, SMTP, POP3.</p>
UNIT-4 12Hrs	<p>Internet Services: Communication services (E-mail, Telnet, VoIP), Information Retrieval services (FTP, Gopher), Web services, World Wide Web (WWW).</p> <p>Internetworking terms: Web Browser and Web Server; Websites, Web Addresses and Web Pages; URL and Domain Names; Web Hosting.</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. Data Communications and Networking By Forouzan, Tata McGraw Hill Company. 2. Computer Networks By A.S. Tanenbaum 3. Computer Network By S.S.Shinde , New Age International Publisher. 4. Data and computer Communication by Shashibanzal , Firewall media . 5. Internetworking with TCP/IP: Principles, protocols, and Architecture Vol 1 5th Edition, PHI publication. 6. Data Communications and Computer Network by Prakash C Gupta, PHI Publication.

DEPARTMENT OF COMPUTER SCIENCE (SECOND SEMESTER)		
COURSE CODE: GE CSP02		COURSE TYPE: GENERIC ELECTIVE COURSE
COURSE TITLE: BASICS OF NETWORKING & COMMUNICATION TECHNOLOGIES LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Discuss various services of internet. 2. Study the working of various networking devices. 3. Study different network protocols. 4. Familiarize with different switching techniques. 5. Create Your Own E-mail Id and practice applications of e-mail. 6. Practice the use of CC and BCC in E-mail. 7. How to Block an E-mail address. 8. Practice the use of attachment option in e-mail. 	

Semester-II

VAC CS02- Cyber Crime & Security-II

COURSE OBJECTIVES:

- Identify the key concepts, roles and domains of Cyber Security.
- Identify the key components of securing networks, systems and applications and data.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Develop a deeper understanding for various types of cyber attacks, cyber crimes, vulnerabilities and remedies thereto.

CO2: Understand the basic security aspects related to Computer and Mobiles.

CO3: Use basic tools and technologies to protect their devices.

CO4: Understand the main component of cyber security plan.

CO5: Get insights into risk-based assessment, requirement of security controls and need for cyber security audit and compliance.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓	✓		✓		✓
CO2	✓	✓					✓		✓	✓
CO3	✓	✓	✓				✓		✓	✓
CO4	✓	✓	✓	✓			✓		✓	✓
CO5		✓		✓				✓	✓	

DEPARTMENT OF COMPUTER SCIENCE (SECOND SEMESTER)		
COURSE CODE: VAC CS02		COURSE TYPE: VALUE ADDITION COURSE
COURSE TITLE: CYBER CRIME & SECURITY-II		
CREDIT: 2	HOURS: 30	MARKS: 50
UNIT-1 15Hrs	<p>Digital Devices Security, Tools and Technologies for Cyber Security: End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions.</p>	
UNIT-2 15Hrs	<p>Cyber security Management, Compliance and Governance: Cyber Security Plan-cyber security policy, cyber crises management plan, Business continuity, Risk assessment, Types of security controls and their goals, Cyber security audit and compliance, National cyber security policy and strategy.</p>	
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 6. The Psychology of Information Security by Ieronzina Tullin. 7. The Information Technology Act, 2000; Bare Act – Professional Book Publishers, New Delhi 8. Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd. 9. Cyber Law in India by Farooq Ahmad; Pioneer Books. 10. Cyber Law & Cyber Crimes By Advocat Prashant Mali; Snow White publications, Mumbai 	

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc DEPARTMENT OF COMPUTER SCIENCE THIRD SEMESTER (Marks Scheme)

Sl. No.	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theor y	Practi cal	Ma x	Min	Max	M i n	Max	Min	Max	Min
1	Data Structures	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Fundamentals of Digital Logic	Discipline Specific Elective Course(DSE)	03	01	60	24	15	-	25	10	100	40
Total			8								200	

SEMESTER	DSCC	DSEC	AEC	SEC or ITP /ATP /PT	VAC	Total Credit
THIRD	A.DSCC-3(4) B.DSCC -3(4) C.DSCC -3(4)	A/B/C; DSEC - 1(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	VAC(2) <i>Choose from a Pool</i>	22 Credit
FOURTH	A.DSCC-4(4) B.DSCC -4(4) C.DSCC -4(4)	A/B/C; DSEC - 2(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i> OR ITP /ATP / PTco(2)	VAC(2) <i>Choose from a Pool</i>	22 Credit
<i>Students on exit shall be awarded Undergraduate Diploma (in field of Multidisciplinary study) after securing the 88 requisite credits in semester I to IV with additional 10 credits (credit 6 essential of job course).</i>						

B.Sc. Semester-III

DSC CS03- Data Structures

COURSE OBJECTIVES:

- Gain understanding of the basic concepts of data structures and algorithms and searching and sorting techniques.
- Write algorithms and solve problems with the help of fundamental data structures.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Have a comprehensive knowledge of the data structures and algorithms on which file structures and data bases are based.

CO2: Understand the importance of data and be able to identify the data requirements for an application.

CO3: Have in depth understanding and practical experience of algorithmic design and implementation.

CO4: Have practical experience of implementing all kinds of data structures.

CO5: Understand the issues involved in algorithm complexity and performance.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓			✓			✓			✓
CO2		✓			✓		✓		✓	
CO3	✓		✓					✓		✓
CO4	✓	✓			✓	✓	✓			✓
CO5	✓	✓		✓		✓			✓	✓

B.Sc. in COMPUTER SCIENCE (THIRD SEMESTER)	
COURSE CODE: DSC CS03 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: DATA STRUCTURES	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	<p>Data Structure: Definition, types, basic operations, applications.</p> <p>Array: concept, Types of array, Applications of arrays.</p> <p>Searching: Linear search and Binary search</p> <p>Sorting: categories of sorting (Internal and External), Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Heap sort.</p>
UNIT-2 12Hrs	<p>Stack and Queue</p> <p>Stack: Concept, Implementation, Operations on Stack, Applications of Stack, Evaluation and Conversion of Infix into Postfix Expression.</p> <p>Queue: Concept, Implementation, Operations On Queue, Types and Applications of Queue.</p>
UNIT-3 11Hrs	<p>Linked List and Tree</p> <p>Linked List: Singly Linked List, Doubly Linked list, Circular linked list, Applications of Linked List.</p> <p>Tree: Definition, Representation and properties of binary tree, Tree traversal (inorder, postorder, preorder), Binary Search Tree, Operations on binary search tree (insertion, deletion), Heap.</p>
UNIT-4 12Hrs	<p>Graph</p> <p>Graph: Terminology, Representation of Graphs, Elementary Graph operations: Graph Traversal (BFS, DFS), Shortest path algorithm (Dijkstra algorithm, Floyd Warshall algorithm) And Minimal spanning tree (Prims and Kruskal algorithm).</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill. 2. Lipschutz, "Data Structures" Schaum's Outline Series, TMH. 3. Data Structures through C in Depth. Author: S. K. Srivastava, Deepali Srivastava. Publisher: BPB Publications.

B.Sc. in COMPUTER SCIENCE (THIRD SEMESTER)		
COURSE CODE: DSC CSP03 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: DATA STRUCTURES		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Write a program in C for addition and multiplication of matrices. 2. Write a program in C for insertion and deletion operations in array. 3. Write a C program to perform PUSH, POP, PEEK operations on Stack. 4. Write a C program to implement insertion & deletion in a queue. 5. Write a C program for linked list insertion, deletion & copy. 6. Write a C program to perform Linear and Binary search. 7. Write a C program to demonstrate working of selection sort algorithm. 8. Write a C program to demonstrate working of bubble sort algorithm. 9. Write a C program to demonstrate working of merge sort algorithm. 10. Write a C program to demonstrate working of quick sort algorithm. 	

B.Sc. Semester-III

DSE CS03- Fundamentals of Digital Logic

COURSE OBJECTIVES:

- Gain knowledge about the working of combinational circuits and sequential circuits.
- Understand optimization of logic circuits and technology mapping.

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Use number systems and complements.

CO2: Understand the fundamentals of Boolean algebra and logic gates.

CO3: Identify the importance of canonical forms in the minimization or other optimization of Boolean formulas in general and digital circuits.

CO4: Minimize functions using any type of minimizing algorithms (Boolean algebra or Karnaugh map).

CO5: Analyze the design and working of Combinational and Sequential circuits.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓			✓		✓				✓
CO3	✓		✓		✓		✓		✓	✓
CO4	✓	✓			✓		✓			✓
CO5	✓	✓	✓	✓		✓	✓	✓	✓	✓

B.Sc. in COMPUTER SCIENCE (THIRD SEMESTER)	
COURSE CODE: DSE CS03 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE	
COURSE TITLE: FUNDAMENTALS OF DIGITAL LOGIC	
CREDIT: 4(3T +1P)	HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)
UNIT-1 15Hrs	<p>Numbers System and Codes</p> <p>Number system: Decimal numbers, Binary numbers, Octal numbers, Hexadecimal numbers, and inter conversions of number systems, binary arithmetic, 1's and 2's complement. Digital codes: Binary coded decimal (BCD), Gray code (code conversion: binary-to- gray and gray- to- binary), Excess-3 code, ASCII code, error detection and error correction codes (parity, check sums, hamming code).</p>
UNIT-2 15Hrs	<p>Logic Gates and Boolean Algebra</p> <p>Logic gates: Basic gates, universal gates, exclusive logic gates. Boolean Algebra: Laws & Theorems , minterms, maxterms, SOP and POS form of Boolean expressions, Simplification of Boolean Functions using Boolean algebra and Karnaugh map techniques(up to 4 variables),don't care condition.</p>
UNIT-3 15Hrs	<p>Combinational Logic Circuits</p> <p>Adders, Subtractors, Encoders, Decoders, BCD-to-Seven Segment Decoders, Multiplexers, Demultiplexers.</p>
UNIT-4 15Hrs	<p>Sequential Logic Circuits and Memories</p> <p>Flip Flops: SR, JK, D and T flip-flops. Registers: Types of Shift Registers, Counter. Memory: Memory hierarchy, ROM, RAM, Cache Memory and Virtual memory, Addressing modes, Instruction format and instruction set.</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. A.Anand Kumar Fundamentals of Digital Circuits, PHI. 2. Rajaraman V&Radhakrishnan, An Introduction to Digital Computer Design, PHI. 3. Jain R.P, Modern Digital Electronics, TMH. 4. Thomas L Floyd, Digital Fundamentals, Universal Book Stall.

B.Sc. in COMPUTER SCIENCE (THIRD SEMESTER)		
COURSE CODE: DSE CSP03 COURSE TYPE : DISCIPLINE SPECIFIC ELECTIVE COURSE		
COURSE TITLE: FUNDAMENTALS OF DIGITAL LOGIC LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK 30 HRS.	<ol style="list-style-type: none"> 1. Study and prove De-Morgan's Theorem. 2. Study and verify the truth table of logic gates. 3. Realization of half/ full adder and subtractor using basic and universal logic gates. 4. Design and implementation of Multiplexer and Demultiplexer. 5. Design and implementation of Encoder. 6. Convert a given octal input to the binary output using 7-segment decoder. 7. Study and verify the truth table of flip-flops. 8. Conversion of flip-flops. 9. Realization of 3-bit counters. 10. Design and implementation of Shift Register. 	

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc FOURTH SEMESTER

DEPARTMENT OF COMPUTER SCIENCE

SI. No	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theory	Practical	Max	Min	Max	Min	Max	Min	Max	Min
1	Object Oriented Programming using C++	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Operating System	Discipline Specific Elective Course(DSE)	03	01	60	24	15	-	25	10	100	40
Total			8								200	

SEMESTER	DSCC	DSEC	AEC	SEC or ITP /ATP /PT	VAC	Total Credit
THIRD	A.DSCC-3(4) B.DSCC -3(4) C.DSCC -3(4)	A/B/C; DSEC - 1(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	VAC(2) <i>Choose from a Pool</i>	22 Credit
FOURTH	A.DSCC-4(4) B.DSCC -4(4) C.DSCC -4(4)	A/B/C; DSEC - 2(4) <i>Choose from a Pool</i>	AEC(2) <i>Choose from a Pool</i>	SEC(2) <i>Choose from a Pool</i> OR ITP /ATP / PTco(2)	VAC(2) <i>Choose from a Pool</i>	22 Credit
<p><i>Students on exit shall be awarded Undergraduate Diploma (in field of Multidisciplinary study) after securing the 88 requisite credits in semester I to IV with additional 10 credits (credit 6 essential of job course)</i></p>						

B.Sc. Semester-IV

DSC CS04- Object Oriented Programming using C++

COURSE OBJECTIVES:

- Understand object-oriented programming concepts and how they are support by C++.
- Build good quality software using object-oriented programming technique.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Able to analyze a simple programming problem specification.

CO2: Gain Knowledge about Object Oriented Programming Language.

CO3: Design a high-level solution to the problem using functional abstraction and general imperative programming language constructs.

CO4: Understand the importance of Data binding, functions and creating objects.

CO5: Understand the concept of Pointers and memory allocation (static and dynamic).

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓				✓	
CO2	✓				✓				✓	✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓	✓	✓	✓		✓				✓
CO5	✓	✓				✓	✓			✓

B.Sc. in COMPUTER SCIENCE (FOURTH SEMESTER)	
COURSE CODE: DSC CS04 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: OBJECT ORIENTED PROGRAMMING USING C++	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	<p>Introduction: procedure-oriented vs. object-oriented programming paradigm, basic characteristics of OOP's, benefits and applications of OOP's.</p> <p>C++ Basics : overview, structure of C++ program, comments, Tokens, keywords, Identifiers and Constants, variable, variable scope, storage classes, Data types, Operators, Input/output, control statements : if-else, switch, while, do-while and for loop.</p>
UNIT-2 12Hrs	<p>Functions in C++: function prototyping, Call by Reference, Return by Reference, Inline Function, Friend Functions.</p> <p>Classes and Objects: Specifying a class, accessing class members, access specifiers, Array within a class, Creating objects, memory allocation for objects, static data & member function, Arrays of object, objects as function argument, use of const keyword.</p> <p>Constructors and Destructors: Need for constructors & destructors, Types of Constructor, Destructor.</p>
UNIT-3 11Hrs	<p>Function overloading, Operator overloading (overloading unary & binary operators), rules for overloading operators.</p> <p>Inheritance: concept, uses & applications, derived classes and modes, Inheritance types (Single, multilevel, multiple, hierarchical, hybrid), virtual base classes and abstract classes.</p>
UNIT-4 12Hrs	<p>Polymorphism: Concepts of polymorphism, types of polymorphism, Overloading & overriding, Virtual function, Static & dynamic binding.</p> <p>Exception Handling: Basics, exception handling mechanism- throw, catch. Files: introduction, classes for file stream operations, opening/closing of files, input/output operations, updating files.</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill. 2. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley. 3. Yaswant Kanetkar, Let us C++, BPB Publications.

B.Sc. in COMPUTER SCIENCE (FOURTH SEMESTER)		
COURSE CODE: DSC CSP04 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: OBJECT ORIENTED PROGRAMMING USING C++ LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Write a C++ Program to check whether number is prime or not. 2. Write a C++ Program to read number and to display the largest value between: (a) Two numbers, (b) Three numbers, (c) Four numbers by using switch-case statements. 3. Write a C++ Program to find sum of first natural numbers: $sum=1+2+3+\dots+100$ by using (a) <i>for</i> loop, (b) <i>while</i> loop, (c) <i>do-while</i> loop. 4. Write a C++ Program to read the element of the given two matrices & to perform the matrix multiplication. 5. Write a C++ Program to exchange the contents of two variables by using (a) Call by value, (b) Call by reference. 6. Write a C++ program to demonstrate concept of friend function and friend class. 7. Write a C++ program to demonstrate concept of inheritance. 8. Write a C++ program to overload <code>==</code> operator to compare two strings. 9. Write a C++ program to demonstrate concept of function overloading. 10. Write a C++ program to demonstrate concept of virtual and pure virtual function. 11. Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file. 12. Write a C++ program to create a function which take a parameter, if the value of parameter is > 0 then throw integer type, if parameter is $=0$, then throw character type, if parameter is < 0 then throws float type exception but for all design use only one catch block. 	

B.Sc. Semester-IV
DSE CS04- Operating System

COURSE OBJECTIVES:

- Understand process and synchronization and scheduling of process.
- Understand the data structures and algorithms used to implement an OS.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Explain the structure and function of operating systems along with their components, types and working.

CO2: Understand the implementation of Operating System architecture.

CO3: Make use of appropriate Linux/Windows commands for memory management, file management and directory management.

CO4: Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.

CO5: Elaborate the system calls for process management and file management.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓		✓			✓	✓	✓
CO2	✓		✓	✓	✓		✓			✓
CO3	✓	✓	✓	✓	✓		✓		✓	✓
CO4	✓	✓					✓		✓	✓
CO5	✓			✓				✓		

B.Sc. in COMPUTER SCIENCE (FOURTH SEMESTER)	
COURSE CODE: DSE CS04 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE	
COURSE TITLE: OPERATING SYSTEM	
CREDIT: 4(3T + 1P)	HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)
UNIT-1 15Hrs	Operating System: Introduction, Types, Functions and Services, System calls. Process Concept: Program and process, Process state, Process Control Block, Operations on Processes, Schedulers, CPU Scheduling-concept, Scheduling criteria, Scheduling algorithms- FIFO, SJF, RR, Priority scheduling, Multi-level and Multi-level feedback.
UNIT-2 15Hrs	Process Synchronization: The Critical-Section Problem, Peterson's Solution, Semaphores, Classical Problems of Synchronization. Deadlock: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance and Detection; Recovery from Deadlock
UNIT-3 15Hrs	Memory Management: Basic concepts, logical and Physical Address space, Swapping, Contiguous Allocation, fragmentation, paging, Segmentation, Virtual memory- Demand paging, page replacement and page replacement algorithm, Thrashing.
UNIT-4 15Hrs	File System: File concept, Access Methods, Directory Structure, Protection, Allocation Methods, and Free-space Management. Secondary storage structure: Disk Structure, Disk Scheduling and RAID Structure. Operating System Case studies: Windows OS, LINUX, Android.
SUGGESTED READINGS	Books: <ol style="list-style-type: none"> 1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley. 2. Operating Systems- Internals and Design Principles, William Stallings, Person 8th Edition. 3. Operating Systems, Godbole and Kahate, McGraw Hill 3rd Edition. 4. Modern Operating Systems, Andrew S. Tanenbaum, Herbert Bos, Person 4th Edition.

B.Sc. in COMPUTER SCIENCE (FOURTH SEMESTER)		
COURSE CODE: DSE CSP04 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE		
COURSE TITLE: OPERATING SYSTEM LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1.) Practice DOS internal commands. 2.) Practice DOS external commands. 3.) Practice Linux commands that works with Directories. 4.) Practice Linux commands that Works with files. 5.) Working with Windows Desktop and utilities <ol style="list-style-type: none"> a. Notepad b. WordPad c. Paint d. Taskbar e. Adjusting display resolution f. Using the browsers g. Configuring simple networking h. Creating users and shares 	

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc FIFTH SEMESTER

DEPARTMENT OF COMPUTER SCIENCE

Sl. No.	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theory	Practical	Max	Min	Max	Min	Max	Min	Max	Min
1	Java Programming	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Software Engineering	Discipline Specific Elective Course(DSE)	03	01	60	24	15	-	25	10	100	40
3	Multimedia & its Applications	Generic Elective Course (GEC)	03	01	60	24	15	-	25	10	100	40
Total			12								300	

SEMESTER	DSCC	DSEC	GEC	AEC	SEC or ITP /ATP /PT	VAC	Total Credit
FIFTH	A.DSCC-5(4) B.DSCC -5(4) C.DSCC -5(4)	A/B/C; DSEC-3(4) <i>Choose from Pool</i>	GEC-3(4) <i>Choose from the Pool</i>	XX	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	XX	22 Credit
SIXTH	A.DSCC-6(4) B.DSCC -6(4) C.DSCC -6(4)	A/B/C; DSEC-3(4) <i>Choose from Pool</i>	GEC-4(4) <i>Choose from the Pool</i>	XX	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	XX	22 Credit

Students on exit shall be awarded Undergraduate Degree (in field of Multidisciplinary study) after securing the 132 requisite credits in semester I to VI

B.Sc. Semester-V

DSC CS05- Programming in Java

COURSE OBJECTIVES:

- To write an Object Oriented computer program to solve specified problems and apply Object Oriented principles like inheritance, polymorphism to develop programs.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Use an integrated development environment to write, compile, run and test simple object-oriented Java programs.

CO2: Identify classes, objects, members of a class and relationships among them needed for a specific problem.

CO3: Write Java application programs using OOP principles and proper program structuring.

CO4: Demonstrate the concepts of polymorphism and inheritance.

CO5: Write java programs to implement error handling techniques using exception handling.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓				✓	
CO2	✓				✓				✓	✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓	✓	✓	✓		✓				✓
CO5	✓	✓				✓	✓			✓

B.Sc. in COMPUTER SCIENCE (FIFTH SEMESTER)	
COURSE CODE: DSC CS05 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: PROGRAMMING IN JAVA	
CREDIT: 4(3T + 1P)	HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)
UNIT-1 10Hrs	Introduction: Introduction to Java, JVM, Java Features, Creation and Execution of Programs, Identifiers, Variables, Constants(final keyword), Data Types and Operators, Structure of Java Program, Type Casting, Conditional Statements, Loops, Arrays, Classes, Objects, Class Declaration, Creating Objects, Nested & inner classes, Class Abstraction and Encapsulation.
UNIT-2 12Hrs	Inheritance and Polymorphism: Types of Inheritance, extends keyword, Method Overriding, super, final Keyword, Abstract classes, Interfaces. Polymorphism, Static versus Dynamic Binding. Packages: Creating and Using Packages, Access Protection, Wrapper Classes, String Class, String Buffer Class.
UNIT-3 11Hrs	Exception Handling: Introduction, exception types, using try and catch, throwing exceptions, User-Defined Exception. Multithreading: Creating threads, Thread Lifecycle, Thread Priority and Synchronization, Suspending resuming and stopping threads. Input/ Output: Introduction, java.io Package, File Streams, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class.
UNIT-4 12Hrs	Applets: Introduction, Life Cycle, Applet Class, Common Methods Used in Displaying the Output. Event Handling: Introduction, Types of Events, Example. AWT: Introduction, Components. Swings: Introduction, Difference between Swing and AWT.
SUGGESTED READINGS	Books: <ol style="list-style-type: none"> 1. java complete reference - by Patrick naughten & Mesut Scpdtd. [TMH] 2. Java Primer - by E.Balaguruswami. 3. Java Programming - Khalid Mughal.

B.Sc. in COMPUTER SCIENCE (FIFTH SEMESTER)		
COURSE CODE: DSC CSP05 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: PROGRAMMING IN JAVA LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Design a program to develop a simple java program. 2. Design a program for various conditional and relational operators. 3. WAP to print first 10 number of the following Series using Do---While Loops 0, 1, 1, 2,3, 5, 8, 11..... 4. WAP to sort the element of One Dimensional Array in ascending order. 5. WAP for matrix multiplication using input/output Stream. 6. WAP the use Boolean data type and print the Prime number Series up to 50. 7. Design a program for class and interface. 8. Design a program for various types of inheritances. 9. WAP to demonstrate concept of Polymorphism. 10. Design a program to create a user defined package. 11. Design a program for exception handling. 	

B.Sc. Semester-V

DSE CS05- Software Engineering

COURSE OBJECTIVES:

- To help students to understand principles of software development process that will enable them to construct software of high quality.

COURSE OUTCOME:

CO1: Acquire knowledge of basic Software Engineering and process model.

CO2: Gain Knowledge about Design Engineering and requirements.

CO3: Analyze & learning with Architectural design, pattern & its basic terminology.

CO4: Understand the importance of testing strategies and matrices.

CO5: Understand the implementation of Testing & techniques.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓	✓			✓		✓	✓
CO2	✓		✓		✓		✓			✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓				✓	✓			✓	✓
CO5	✓	✓		✓		✓	✓	✓		✓

B.Sc. in COMPUTER SCIENCE (FIFTH SEMESTER)	
COURSE CODE: DSE CS05 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE	
COURSE TITLE: SOFTWARE ENGINEERING	
CREDIT: 4	HOURS: 60 MARKS: 100 (SEE: 80 CCA: 20 Practical: 00)
UNIT-1 15Hrs	Introduction to Software Engineering: Definition, Software Products and Software process, Software development life cycle, Software Process Models- Waterfall Model, Prototype Model, Spiral Model, Incremental Model.
UNIT-2 15Hrs	Software Requirements: Functional and Non-Functional Requirements, Software Requirement and Specification (SRS) document. Structured Analysis: Data Flow Diagram, Context Diagram, and Data Dictionary.
UNIT-3 15Hrs	Software Design and Coding: Principles of software design- Partitioning, Abstraction, Top Down and Bottom Up Strategies. Concept of Module- Coupling and Cohesion. Coding- Rules of Good Programming Style, Code verification.
UNIT-4 15Hrs	Estimation and Scheduling of Software projects: Cost estimation techniques- COCOMO model. Project Scheduling, Time-line Charts. Software Testing: Verification and Validation; Error, Fault and Failure; Types of Testing- Black Box and White Box testing; Levels of testing- Unit, Integration, System, Acceptance.
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. Software Engineering: A Practitioner's Approach. Roger S. Pressman, Tata McGraw-Hill. 2. Software Project Management, Walker Royce, Pearson Education. 3. Fundamentals of Software Engineering, Rajib Mall, PHI Learning Pvt. Ltd. 4. Software Engineering, Ian Sommerville, Pearson Education Inc., New Delhi.

B.Sc. in COMPUTER SCIENCE (FIFTH SEMESTER)		
COURSE CODE: DSE CSP05 COURSE TYPE :DISCIPLINE SPECIFIC ELECTIVE COURSE		
COURSE TITLE: SOFTWARE ENGINEERING LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK 30 HRS.	<ol style="list-style-type: none"> 1. Familiarize with Software Engineering and Software Development Life Cycle (SDLC). 2. Prepare a SRS document for any project in line with the IEEE recommended standards. 3. Study and development of various UML diagrams. <ol style="list-style-type: none"> i) Use case diagram ii) Activity diagram iii) Class diagram iv) State transition diagram 4. Development of Level-0 and Level-1 DFD for the project. 5. Development of E-R diagram for the project. 6. Cost Estimation for the project. 7. Study of various types of software testing. 	

Semester-V

GE CS05- Multimedia & its Applications

COURSE OBJECTIVES:

- To acquire knowledge in multimedia components, multimedia tools and its applications.
- To explore the latest trends and technologies in multimedia.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Define what Multimedia is and how it works.

CO2: Understand multimedia components using various tools and techniques.

CO3: Analyze and interpret Multimedia data.

CO4: Discuss about different types of media format and their properties.

CO5: Familiarize with Internet and Multimedia.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓		✓		✓			✓
CO2	✓	✓	✓		✓			✓		✓
CO3	✓	✓	✓	✓			✓	✓	✓	✓
CO4	✓				✓	✓				
CO5	✓			✓		✓			✓	✓

DEPARTMENT OF COMPUTER SCIENCE (FIFTH SEMESTER)	
COURSE CODE: GE CS05 COURSE TYPE: GENERIC ELECTIVE COURSE	
COURSE TITLE: MULTIMEDIA & ITS APPLICATION	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	<p>Multimedia: Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.</p> <p>Text: Fonts & Faces, Using Text in Multimedia, Fonts Editing & Design Tools, Hypermedia & Hypertext.</p>
UNIT-2 12Hrs	<p>Images: Still Images- bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, Computerized colors, color palettes, image file formats.</p> <p>Sound: Digital Audio, MIDI Audio, MIDI vs. Digital Audio, Audio File Formats.</p>
UNIT-3 11Hrs	<p>Video: How video works, analog video, digital video, video file formats, video shooting and editing.</p> <p>Animation: Principle of animation, animation techniques, animation file formats.</p>
UNIT-4 12Hrs	<p>Internet and Multimedia: www and HTML, multimedia on the web- web servers, web browsers, web page makers and site builders.</p> <p>Hardware peripherals: Connections, Memory and storage devices, Multimedia software and Authoring tools.</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. Tay Vaughan, Multimedia: Making it work, TMH, Eighth edition.2011 2. Ralf Steinmetz and Klara Naharstedt, Multimedia: Computing, Communications Applications, Pearson.2012 3. Keyes, Multimedia Handbook, TMH, 2000. 4. K. Andleigh and K. Thakkar, Multimedia System Design, PHI.2013

DEPARTMENT OF COMPUTER SCIENCE (FIFTH SEMESTER)		
COURSE CODE: GE CSP05		COURSE TYPE: GENERIC ELECTIVE COURSE
COURSE TITLE: MULTIMEDIA & ITS APPLICATION LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<p>➤ Practical exercises based on concepts listed in theory using Flash/GIMP/Photoshop/Animation Tools/ Image Editors/Video Editors.</p>	

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Rajeev Gandhi Govt. Post Graduate College, Ambikapur, Chhattisgarh

B.Sc

DEPARTMENT OF COMPUTER SCIENCE

SIXTH SEMESTER (Marks Scheme)

Sl. No.	Title of Paper	Paper Type	Credit		Theory (Marks)		Internal (Marks)		Practical (Marks)		Total (Marks)	
			Theory	Practical	Max	Min	Max	Min	Max	Min	Max	Min
1	Database Management System	Discipline Specific Core Course (DSC)	03	01	60	24	15	-	25	10	100	40
2	Computer Networks	Discipline Specific Elective Course(DSE)	03	01	60	24	15	-	25	10	100	40
3	Fundamental Concepts of Programming	Generic Elective Course (GEC)	03	01	60	24	15	-	25	10	100	40
Total			12								300	

SEMESTER	DSCC	DSEC	GEC	AEC	SEC or ITP /ATP /PT	VAC	Total Credit
FIFTH	A.DSCC-5(4) B.DSCC -5(4) C.DSCC -5(4)	A/B/C; DSEC-3(4) <i>Choose from Pool</i>	GEC-3(4) <i>Choose from the Pool</i>	XX	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	XX	22 Credit
SIXTH	A.DSCC-6(4) B.DSCC -6(4) C.DSCC -6(4)	A/B/C; DSEC-3(4) <i>Choose from Pool</i>	GEC-4(4) <i>Choose from the Pool</i>	XX	SEC(2) <i>Choose from a Pool</i> OR ITP/ATP/PTco(2)	XX	22 Credit

Students on exit shall be awarded Undergraduate Degree (in field of Multidisciplinary study) after securing the 132 requisite credits in semester I to VI

B.Sc. Semester-VI

DSC CS06- Database Management System

COURSE OBJECTIVES:

- To provide basic knowledge of a database management system and to formulate queries in SQL for Database manipulation.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Acquire knowledge of basic Database design.

CO2: Gain Knowledge about Relational Model.

CO3: Analyze & learning with Database design concept.

CO4: Understand the importance of Normal forms.

CO5: Understand the implementation of Transaction Processing techniques.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓			✓		✓				
CO2	✓		✓		✓					✓
CO3	✓	✓	✓		✓		✓	✓	✓	
CO4	✓	✓					✓			✓
CO5	✓	✓	✓	✓		✓			✓	✓

B.Sc. in COMPUTER SCIENCE (SIXTH SEMESTER)	
COURSE CODE: DSC CS06 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE	
COURSE TITLE: DATABASE MANAGEMENT SYSTEM	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	<p>Introduction: Data & Information, File systems versus Database systems, Data Models (network, hierarchical, relational), Schemas and Instances, Three-Schema Architecture and Data Independence, DBMS users, Roles of DBA.</p> <p>Data Modeling: Entity- Relationship Diagram, Concept of Keys: candidate key, primary key, alternate key, foreign key; Case studies of ER modeling; Generalization, Specialization and Aggregation; Converting an ER model into relational schema.</p>
UNIT-2 12Hrs	<p>Relational Model and Database Design: Relational Algebra (select, project, cross product, joins and set operations). Functional dependencies, Normalization, Normal Forms- 1NF, 2NF, 3NF, BCNF, 4NF and 5NF; Codd's 12 Rules.</p>
UNIT-3 11Hrs	<p>Structured Query Language (SQL): Data types, Types of database languages (DDL, DML, DCL, and TCL), Data constraints (NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY and CHECK), SQL- Clauses, Operators, Functions (Aggregate and Scalar), Join and Set operations in SQL, SQL- query, sub-query, nested query, Views and Trigger.</p>
UNIT-4 12Hrs	<p>Transactions and Concurrency Control: Transaction- definition, states, ACID properties, Schedule. Concurrency Control in DBMS- overview, Concurrency control problems, Concurrency Control Protocols (Lock based and Timestamp based).</p>
SUGGESTED READINGS	<p>Books:</p> <ol style="list-style-type: none"> 1. Fundamentals of Database Systems, R Elmasri& S B. Navathe, PearsonEducation. 2. Database Systems Concepts, ASilberschatz, H F. Korth& S. Sudarshan,McGraw-Hill. 3. Fundamentals of Database Management Systems, Mark L. Gillenson, Wiley India Pvt. 4. Introduction to Database Systems, C.J.Date, Longman, PearsonEducation.

B.Sc. in COMPUTER SCIENCE (SIXTH SEMESTER)		
COURSE CODE: DSC CSP06 COURSE TYPE: DISCIPLINE SPECIFIC CORE COURSE		
COURSE TITLE: DATABASE MANAGEMENT SYSTEM		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Practicing DDL commands. 2. Practicing DML commands. 3. Querying (using ANY, ALL, IN, EXISTS, NOT EXISTS, Constraints etc.) 4. Queries using Aggregate functions, GROUP BY, HAVING. 5. Practical based on Set operations. 6. Practical based on Join operations. 7. Creation and dropping of Views. 	

B.Sc. Semester-VI
DSE CS06- Computer Networks

COURSE OBJECTIVES:

- Familiarize the students with the basic taxonomy and terminology of the computer networking area.
- Identify the different types of network topologies and protocol.
- Enumerate the layers of the OSI model and TCP/IP. Explain the functions of each layer.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Understand the concepts of Data Communication.

CO2: Study the functions of OSI Layers.

CO3: Familiarize with the Transmission Media, Flow control, Error detection & correction.

CO4: Understand fundamental concepts in Routing, Addressing & working of Transport Protocols.

CO5: Describe, analyze and compare different data link, network, and transport and application layer protocols.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓		✓			✓	✓	✓
CO2	✓		✓	✓	✓		✓			✓
CO3	✓	✓	✓	✓	✓		✓		✓	✓
CO4	✓	✓					✓		✓	✓
CO5	✓			✓				✓		

B.Sc. in COMPUTER SCIENCE (SIXTH SEMESTER)	
COURSE CODE: DSE CS06 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE	
COURSE TITLE: COMPUTER NETWORKS	
CREDIT: 4(3T + 1P)	HOURS: 75
MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 15Hrs	Introduction: Goals and applications of network, Types of computer networks, Internet, Intranet, Network topologies, The OSI reference model, TCP/IP protocol suite, Networking devices.
UNIT-2 15Hrs	Physical Layer: Analog and digital data, Transmission modes, Transmission media, Switching Techniques and Multiplexing. Data Link Layer: Data link layer services, Error Detection & Correction techniques, Framing, Flow control (Protocols- Stop-and-Wait ARQ, Go-Back-N and Selective Repeat ARQ), multiple access protocols, MAC addressing, Ethernet, Wireless LANs.
UNIT-3 15Hrs	Network Layer: Logical Addressing, subnetting, delivery, forwarding and Routing- (Distance Vector and Link state routing), Network Layer Protocols- (ARP, RARP, IPV4, IPV6, ICMP, IGMP, DHCP).
UNIT-4 15Hrs	Transport Layer: Process-to-Process Delivery- (client-server paradigm, connectionless versus connection oriented services, reliable versus unreliable), Transport layer protocols (TCP and UDP), TCP Congestion control, Quality of Service. Application Layer: Domain Name System(DNS), WWW and HTTP, Remote login (TELNET), Electronic Mail, File Transfer Protocol (FTP), Network Management- SNMP, Cryptography- basic concept.
SUGGESTED READINGS	Books: <ol style="list-style-type: none"> 1. Computer Networks, Andrew S. Tanenbaum, PHI / Pearson Education Inc. 2. Data communication and Networking, Behrouz A. Forouzan, Tata McGraw-Hill. 3. Computer Networking- A Top-Down Approach, Kurose and Ross, Pearson. 4. Data and Computer Communication, William Stallings, Pearson.

B.Sc. in COMPUTER SCIENCE (SIXTH SEMESTER)		
COURSE CODE: DSE CSP06 COURSE TYPE: DISCIPLINE SPECIFIC ELECTIVE COURSE		
COURSE TITLE: COMPUTER NETWORKS		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Practice about IP Address. 2. Sharing of Printers. 3. Develop local area network using Windows and Linux Operating System. 4. Practice about Internet and its applications. 5. Practice about installation of various Networks based Operating System. 6. Practice about Client Server architecture. 7. Practice the installation of bus topology of LAN. 8. Familiar about various networking devices. 9. Sharing of file and folders. 10. Communication between two servers. 11. Practice the demonstration of static and dynamic IP 12. Practice the establishment of Ethernet Connection. 	

Semester-VI

GE CS06- Fundamental Concepts of Programming

COURSE OBJECTIVES:

- To understand the concept of basic computer algorithm and flowchart and use algorithm for various problem solving.
- To understand basic principles of structured programming.

COURSE OUTCOME:

Students, after completion of this course will be able to:

CO1: Understand various programming paradigm.

CO2: Understand the basics of programming languages.

CO3: Analyze & learning with C-Programming & its basic terminology.

CO4: Understand the implementation of Control Structure and Array.

CO5: Familiarize with OOP's concepts.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓		✓			✓	✓	
CO2		✓			✓					✓
CO3	✓						✓	✓		✓
CO4	✓	✓	✓	✓	✓					
CO5	✓		✓	✓	✓	✓	✓	✓		✓

DEPARTMENT OF COMPUTER SCIENCE (SIXTH SEMESTER)	
COURSE CODE: GE CS06 COURSE TYPE: GENERIC ELECTIVE COURSE	
COURSE TITLE: FUNDAMENTAL CONCEPTS OF PROGRAMMING	
CREDIT: 4(3T + 1P) HOURS: 75 MARKS: 100 (SEE: 60 CCA: 15 Practical: 25)	
UNIT-1 10Hrs	Programming Language: Introduction, generation of programming language, programming paradigm, procedure-oriented vs. object oriented programming.
UNIT-2 12Hrs	Language Translators: Assembler, Interpreter, Compiler. Programming IDE and Environment. Algorithm and Flowchart – definition, examples.
UNIT-3 11Hrs	Basics of C programming Language: Introduction, History, Simple C program, variables, token, data types, operators, Input/output statements, control statements, Array.
UNIT-4 12Hrs	Introduction to Object Oriented Programming (OOP): Features of OOP's – Class, Object, Abstraction, Encapsulation, Inheritance, and Polymorphism.
SUGGESTED READINGS	Books: 1. Programming in C “ YashwantKanetkar”. BPB Publications.Tenth Edition. 2. Programming in ANSI C- by E.Balagurusamy-Tata McGraw Hill. 3. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill. 4. BjarneStroustrup, The C++ Programming Language, Addison Wesley.

DEPARTMENT OF COMPUTER SCIENCE (SIXTH SEMESTER)		
COURSE CODE: GE CSP06		COURSE TYPE: GENERIC ELECTIVE COURSE
COURSE TITLE: FUNDAMENTAL CONCEPTS OF PROGRAMMING LAB		
CREDIT : 01	HOURS: 30	PRACTICAL MARKS: 25
LABORATORY WORK	<ol style="list-style-type: none"> 1. Write a C program to find largest number among three numbers. 2. Write a C program to check whether the given number is even or odd. 3. Write a C program to calculate area and circumference of a circle. 4. Write a C program for arithmetic operations using switch statement. 5. Write a C program to display Fibonacci series using for loop. 6. Write a C program to find sum of first n natural numbers using while loop. 7. Write a C program to swap two numbers with and without using temporary variable. 8. Write C program's to demonstrate Array. 	