School of Engineering and Technology

Programme Structure & Syllabus

Bachelor of Computer Application (BCA)

2024-25

K.K. University

Bihar Sharif, Nalanda – 803115

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School of Engineering & Technology.

Department of Computer Science & Engineering

Bachelor of Computer Science

Objective of the Program:

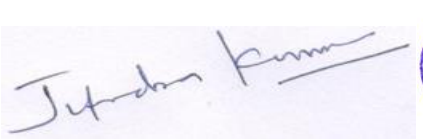
The primary objective of the **Bachelor of Computer Applications (BCA)** program is to prepare students for a career in the field of information technology (IT) and computer applications. Specifically, the BCA program aims to achieve the following objectives:

1. **Technical Skills**: Provide students with a strong foundation in key areas of computer science and IT, including programming languages, software development, database management, networking, and web development.
2. **Practical Knowledge**: Equip students with hands-on experience through practical sessions, projects, and internships to ensure they can apply theoretical knowledge in real-world scenarios.
3. **Problem-solving Abilities**: Develop analytical and problem-solving skills essential for designing and developing software solutions, troubleshooting issues, and optimizing IT infrastructure.
4. **Industry Relevance**: Keep the curriculum updated with current industry trends and technologies to ensure graduates are prepared for the demands of the IT industry.
5. **Communication and Soft Skills**: Enhance communication skills, teamwork, and interpersonal skills necessary for effective collaboration in professional environments.
6. **Career Readiness**: Prepare graduates for entry-level positions in software development firms, IT companies, consulting firms, and other organizations where IT skills are in demand.

Program Education Outcomes (PEOs):

Program Education Outcomes (PEOs) for the Bachelor of Computer Applications (BCA) describe what students are expected to achieve by the time they graduate from the program. These outcomes are designed to reflect the knowledge, skills, and abilities that students should have acquired during their course of study. Here are typical Program Education Outcomes for a BCA program:

1. **Technical Knowledge**: Graduates should demonstrate a strong understanding of the fundamental principles of computer science and IT, including programming languages, data structures, algorithms, software engineering principles, database management, networking, and web technologies.
2. **Problem-solving Skills**: Graduates should be able to analyze problems, design and implement software solutions using appropriate methodologies, and evaluate their effectiveness.



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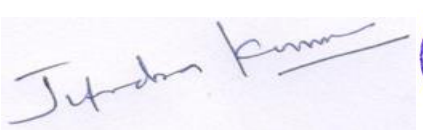
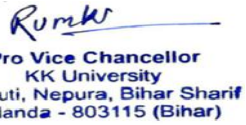
3. **Software Development Skills**: Graduates should possess the ability to develop software applications across various platforms, including desktop, web, and mobile environments, adhering to best practices in software engineering.
4. **Professional Competence**: Graduates should exhibit professional competence in areas such as software testing, debugging, maintenance, and documentation.
5. **Teamwork and Collaboration**: Graduates should be capable of working effectively in teams, demonstrating leadership skills, and contributing positively to team goals.
6. **Continuous Learning**: Graduates should recognize the importance of lifelong learning and professional development, keeping pace with advancements in technology and adapting to changing industry needs.
7. **Career Development**: Graduates should be prepared for entry-level positions in software development, IT consulting, system analysis, and related fields, or for pursuing higher education in computer science or related disciplines.

Program Outcomes (POs):

Program Outcomes (POs) for the Bachelor of Computer Applications (BCA) are specific statements that describe what students are expected to know and be able to do by the time they complete their degree. These outcomes are aligned with the educational goals of the program and provide a framework for assessing student learning and program effectiveness. Here are typical Program Outcomes for a BCA program:

1. **PO1: Knowledge of Computer Applications**: Graduates will demonstrate knowledge and understanding of core concepts and principles in computer applications, including programming languages, data structures, algorithms, and software development methodologies.
2. **PO2: Problem Analysis**: Graduates will be able to analyze complex computing problems and design computing-based solutions using principles of computer science and mathematics appropriate to the discipline.
3. **PO3: Design/Development of Solutions**: Graduates will be able to design, implement, and evaluate computer-based systems, processes, components, or programs to meet desired needs and specifications.
4. **PO4: Conduct Investigations of Computing Problems**: Graduates will be able to conduct research-oriented investigations into complex problems using research methods, analysis, and interpretation of data.
5. **PO5: Modern Tool Usage**: Graduates will be proficient in the use of modern computing tools and techniques necessary for computing practice.
6. **PO6: Professionalism**: Graduates will understand and apply professional, ethical, legal, security, and social issues and responsibilities relevant to computing practice.
7. **PO7: Communication**: Graduates will be able to communicate effectively with a range of audiences using appropriate formats and media.
8. **PO8: Lifelong Learning**: Graduates will recognize the need for and engage in continuing professional development and lifelong learning to remain current in the rapidly changing field of computer applications.
9. **PO9: Project Management and Finance**: Graduates will demonstrate knowledge and understanding of management principles and practices applied to software projects, including project planning, execution, and budgeting.



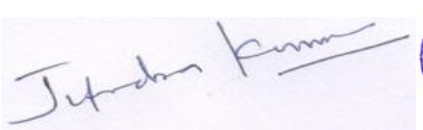
These Program Outcomes ensure that graduates of the BCA program are well-prepared with the knowledge, skills, and attitudes necessary to succeed in various roles within the field of computer applications and related industries.

Program Specific Outcomes (PSOs) :

Program Specific Outcomes (PSOs) for the Bachelor of Computer Applications (BCA) are statements that further specify the educational objectives of the program and describe the specific skills and competencies that students are expected to develop by the time they complete their degree. Here are typical Program Specific Outcomes for a BCA program:

1. **PSO1: Programming Proficiency**: Graduates will demonstrate proficiency in programming languages such as C, C++, Java, Python, etc., and be able to apply programming concepts to solve computational problems.
2. **PSO2: Web Development Skills**: Graduates will possess skills in web development, including client-side and server-side scripting, web application frameworks, and database integration for dynamic web applications.
3. **PSO3: Database Management**: Graduates will be proficient in database management systems (DBMS), including designing databases, querying data using SQL, and implementing database applications.
4. **PSO4: Software Engineering Practices**: Graduates will apply software engineering principles and practices such as software design, testing, debugging, and maintenance throughout the software development lifecycle.
5. **PSO5: Networking Knowledge**: Graduates will have an understanding of computer networks, network protocols, network security principles, and be able to configure and troubleshoot basic network setups.
6. **PSO6: Mobile Application Development**: Graduates will have skills in developing mobile applications for different platforms (e.g., Android, iOS) using appropriate development tools and techniques.
7. **PSO7: Data Analytics and Visualization**: Graduates will be able to analyze data, apply statistical techniques, and visualize data using tools and libraries for data analytics and visualization.
8. **PSO8: Project Management Skills**: Graduates will demonstrate skills in project management, including project planning, scheduling, resource allocation, and risk management, particularly in the context of software development projects.
9. **PSO9: Ethical and Professional Behavior**: Graduates will adhere to ethical standards and demonstrate professional behavior in their interactions with clients, colleagues, and stakeholders in the IT industry.
10. **PSO10: Problem-solving and Critical Thinking**: Graduates will demonstrate the ability to critically analyze problems, evaluate alternative solutions, and make informed decisions based on technical knowledge and logical reasoning.

These Program Specific Outcomes ensure that BCA graduates possess specialized skills and competencies that are directly relevant to the field of computer applications and IT industry demands. They provide a clear framework for assessing the attainment of specific skills and knowledge areas critical for professional success in various roles within the IT sector.



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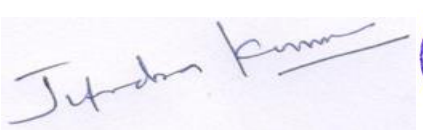

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Bachelor of Computer Application (BCA)

Program/Course Structure

FIRST SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA1101	Mathematics -I	4	3	1	0	4	30	70
2	BCA1102	Introduction to Computer Science	4	3	1	0	4	30	70
3	BCA1103	Programming in C	3	3	0	0	3	30	70
4	BCA1104	Environmental Science	1	3	1	0	1	30	70
5	BCA1105	Communication Skill	4	3	1	0	4	30	70
6	BCA1103P	Programming in C Lab	2	0	0	2	4	30	70
7	BCA1105P	Communication Skill Lab	2	0	1	2	4	30	70
TOTAL			**20**	**15**	**5**	**4**	**24**	**210**	**490**

SECOND SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA1201	Mathematics -II	4	3	1	0	4	30	70
2	BCA1202	Data structure Using C	4	4	0	0	4	30	70
3	BCA1203	Database Management System	3	4	0	0	3	30	70
4	BCA1204	Physics	4	3	1	0	4	30	70
5	BCA1205	Chemistry	4	3	1	0	4	30	70
6	BCA1202P	Data structure Using C Lab	2	0	0	2	4	30	70
7	BCA1203P	Database Management System Lab	2	0	0	2	4	30	70
TOTAL			**23**	**17**	**3**	**4**	**27**	**210**	**490**

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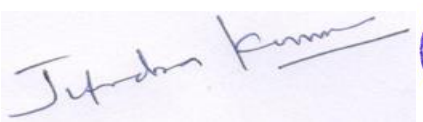
THIRD SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA2101	Cloud Computing	4	3	1	0	4	30	70
2	BCA2102	Operating System	4	4	0	0	4	30	70
3	BCA2103	Electronic Commerce & Application	4	3	1	0	4	30	70
4	BCA2104	Object Oriented Programming	3	3	1	0	3	30	70
5	BCA2105	Dot Net Technology	3	3	0	0	3	30	70
6	BCA2104P	Object Oriented Programming Lab	3	0	1	2	6	30	70
7	BCA2105P	Dot Net Technology Lab	3	0	0	2	6	30	70
TOTAL			**24**	**16**	**4**	**4**	**30**	**210**	**490**

FOURTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA2201	Artificial Intelligence	4	3	1	0	4	30	70
2	BCA2202	Software Engineering	3	4	0	0	3	30	70
3	BCA2203	Computer Architecture	4	4	0	0	4	30	70
4	BCA2204	Basic Electronic	3	3	0	0	3	30	70
5	BCA2205	Managerial Economics	4	3	1	0	4	30	70
6	BCA2202P	Software Engineering Lab	2	0	0	2	4	30	70
7	BCA2204P	Basic Electronic Lab	2	0	0	2	4	30	70
TOTAL			**22**	**17**	**2**	**4**	**26**	**210**	**490**



FIFTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA3101	Internet & Web Technology	3	3	1	3	3	30	70
2	BCA3102	Java Programming	4	4	0	3	4	30	70
3	BCA3103	Fundamental of Computer Algorithm	4	4	0	0	4	30	70
4	BCA3104	Fuzzy Logic	4	4	0	0	4	30	70
5	BCA3105	Management Information System	3	3	1	0	3	30	70
6	BCA3101P	Internet & Web Technology Lab	2	0	1	2	4	30	70
7	BCA3102P	Java Programming Lab	2	0	0	2	4	30	70
		TOTAL	**22**	**18**	**3**	**10**	**26**	**210**	**490**

SIXTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA3201	Data Communication & Network	4	3	1	0	4	30	70
2	BCA3202	Distributed Computing	4	4	0	0	4	30	70
3	BCA3203	Optimization Theory	4	4	0	0	4	30	70
4	BCA3204	Accounting and Financial Management	3	3	0	0	3	30	70
5	BCA3205A BCA3205B BCA3205C BCA3205D	Elective: (1) Intelligence System (2) Advance network and Communication (3) Image Processing (4) Advance Unix Programing	4	4	0	0	4	30	70
6	BCA3206P	Project	4	0	0	3	4	30	70
TOTAL			**23**	**18**	**1**	**3**	**23**	**180**	**420**

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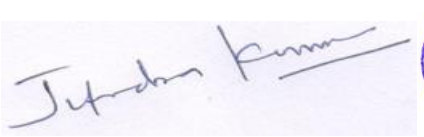

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SEMESTER - I

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1101
Course Name	Mathematics –I
Course Credits	4 (L) + 0(P)= 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This course in Differential and Integral Calculus provides a comprehensive exploration of fundamental concepts in calculus and their applications. It covers topics from differential calculus, including successive differentiation, Taylor's theorem, and partial derivatives, to integral calculus with definite and multiple integrals and their applications. The course also delves into differential equations, addressing both ordinary and partial differential equations. Students will learn to apply calculus techniques to solve problems in various fields, enhancing their analytical and problem-solving skills.

2. Prerequisite:

Basic understanding of single-variable calculus. Familiarity with algebra and trigonometry. Fundamental knowledge of mathematical functions and their properties

3. Objective of Syllabus:

To develop a deep understanding of the principles and techniques of differential and integral calculus. To enable students to apply calculus methods to solve real-world problems involving rates of change and accumulation. To introduce students to the concepts and solutions of differential equations. To enhance analytical thinking and problem-solving abilities through rigorous practice and application of calculus concepts

4. Course Outcome:

S. No.	Course Outcomes (Cos)

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CO1	Successive Differentiation and Leibnitz Theorem: Understand and apply the rules for the differentiation. Taylor's Theorem and Series.
CO2	Apply Euler's theorem on homogeneous functions Change of Variables. Compute the total differential of functions. Taylor's Series in Two Variables. Maxima and Minima of Multivariable Functions
CO3	Definite Integrals: Evaluate definite integrals and apply them. Multiple Integrals: Calculate double and triple integrals. Change of Order of Integration.
CO4	Transformation to Polar Coordinates: Convert integrals from Cartesian to polar coordinates and apply them in appropriate contexts.
CO5	First-Order Differential Equations, Higher-Order Differential Equations with Constant Coefficients.
CO6	Linear Partial Differential Equations: Formulate and solve linear partial differential equations of the first order and higher-order.

5. Syllabus.

Module I:

Differential Calculus: Successive differentiation, Leibritiz Theorem, Taylors theorem with Lagranges forms of remainders, Expansion of a function of one variable in Taylors and Meclanrin's infinite series. Maxima and Minima of one variable, partial Derivatives.

Module II:

Euler's theorem, change of variables, total differentiation, Errors and approximation. Taylors series in two variables. Maxima and Minima of two or more variables.

Module III:

Integral Calculus Definite integral and its application for area, length and volume. Multiple integrals. Change of order of integration. Transformation of integral from Cartesian to polar. Applications in areas, volume and surfaces.

Module IV:

Differential Equation First degree and first order Differential equation : Higher order differential equation with constant coefficients. Linear partial differential equation of first order P.D.E. of higher with constant coefficients.

BOOKS AND REFERENCES:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers.
2. Das BC and Mukherjee, Integral Calculus, Calcutta, U.N. Dhar Publishers.
3. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.
4. Advance engineering mathematics by E. Kreyszig, 8 th Edition, John Wiley & Sons, New York

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5. Advance engineering mathematics by Wiley & Barratt- Tata McGraw Hill 6. Linear Algebra by K. Hoffman and R Kunze-Prentice Hall

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1102
Course Name	Introduction to Computer Science
Course Credits	3 (L) + 1(T)= 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**
   The course objective of an Introduction to Computer Science typically aims to provide students with a foundational understanding of the principles, concepts, and practices within the field of computer science. like Fundamental Concepts of computer science.

2. **Prerequisite:**
   High School Diploma or Equivalent Typically, students should have completed high school or its equivalent.

3. **Objective of Syllabus:**
   The course objective of an Introduction to Computer Science typically aims to provide students with a foundational understanding of the principles, concepts, and practices within the field of computer science. like Fundamental Concepts of computer science, Understanding of Computing Systems including how computers work, the organization of hardware and software components, and the role of different layers in the computing stack.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Understanding of Basic Concepts: Students should demonstrate a solid understanding of fundamental concepts in computer science.
CO2	Understanding of Computing Systems: Students should comprehend the basic principles of computing systems, including computer organization, memory management, input/output operations, and the role of operating systems and compilers.

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CO3	Ethical and Social Awareness: Students should develop an awareness of ethical issues related to computing, including privacy, security, intellectual property, and the societal impact of technology.
CO4	Communication and Collaboration Skills: Students should enhance their ability to communicate technical concepts effectively, both orally and in writing, and collaborate with peers on programming assignments.
CO5	Understand Computer Program Introduction, Developing a Program, Algorithm, Flowchart, Psedocode (P-Code).Computer Languages Introduction, Evolution of Programming Languages, Classification of ProgrammingLanguages,
CO6	Preparation for Further Study or Careers: Students should be prepared to pursue further study in computer science or related fields.

5. Syllabus.

UNIT -I

Introduction To Computers, Characteristics of computers, Evolution of computers, Generation of Computers, Classification of Computers, The Computer System, Applications of Computers. Number Systems And Logic Gates Introduction, Number Systems, Conversion between Number Bases, Arithmetic System,Signed and Unsigned Numbers, Concept of Overflow, Binary Coding, Logic Gates, BooleanAlgebra, Combination of Logic Gates.Computer Architecture Introduction, Central Processing Unit (CPU) Memory, Communication between Various Units of a Computer System, The Instruction Format, Instruction Set, Processor Speed, Multiprocessor Systems.

UNIT -II

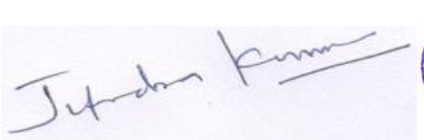
Primary Memory Introduction, Memory Hierarchy, Random Access Memory (RAM), Types of RAM, Read Only Memory (ROM), Types of ROM. Secondary Storage Introduction, Classification of Secondary Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk, Magneto Optical disk. Input Devices Introduction, Keyboard, Pointing Devices, Speech Recognition, Digital Camera, Scanners,Optical Scanners.

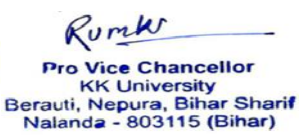
UNIT -III

Output Devices Introduction, Classification of Output, Hard Copy Output Devices, Printers, Plotters, Computer Output Microfilm (COM), Soft Copy Output Devices, Monitors, Audio Output, Projectors, Terminals. Computer Program Introduction, Developing a Program, Algorithm, Flowchart, Psedocode (P-Code).Computer Languages Introduction, Evolution of Programming Languages, Classification of ProgrammingLanguages, Generations of Programming Languages, Features of a Good Programmin Language, Selection of a Programming Language.

UNIT -IV

Computer Software , Definition, Relationship between Software and Hardware, Software Categories, System Software, Application Software, Software Terminology. Operating System Introduction, Operating System, Evolution of Operating System, Types of Operating System, Functions of an Operating System, Modern Operating Systems. Data Communication And Computer



NetworkIntroduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network devices.

Suggested reading :

1. Introduction to computer Science, ITL Education solution Limited, R&D Wing, PEARSON Education, Edition 2004.
2. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi – 2 nd edition, 1996.

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1103
Course Name	Programming in C
Course Credits	3 (L) + 2(P)= 5
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

The objective of C programming is the goals of learning and using the C programming language. C is known for its efficiency and close-to-hardware capabilities. Portability: C programs can be written to be highly portable across different platforms and operating systems. Performance, Flexibility: C is a versatile language that can be used for a wide range of applications. Learning: Learning C provides a solid foundation in programming concepts such as variables, data types, control structures, functions, and memory management.

2. Prerequisite:

Before using C programming, it's helpful to have a basic understanding of certain concepts and skills. Here are some prerequisites:
Basic Computer Literacy: You should be comfortable using a computer, navigating file systems, and performing basic tasks like creating, editing, and saving files. Understanding of Algorithms and Logic, Mathematical Foundations.

3. Objective of Syllabus:

The objective of C programming is the goals of learning and using the C programming language. C is known for its efficiency and close-to-hardware capabilities. C programs can be written to be highly portable across different platforms and operating systems. C offers high performance and execution

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speed, making it ideal for applications. C is a versatile language that can be used for a wide range of applications. Learning C provides a solid foundation in programming concepts such as variables, data types, control structures, functions, and memory management. C is commonly used for developing system software like operating systems, compilers, interpreters

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understanding of Basic Syntax: Students should be able to understand and apply the basic syntax of the C programming language, including variables, data types, operators, expressions, statements, and functions.
CO2	Control Structures Mastery: Students should be proficient in using control structures such as if-else statements, loops (for, while, do-while), and switch-case statements for flow control in their programs.
CO3	Arrays and Pointers: Students should have a solid understanding of arrays and pointers and be able to use them in their programs. Array manipulation, dynamic memory allocation, and passing arguments by reference.
CO4	Functions and Modular Programming: Students should be able to define and use functions to break down programs into smaller, more manageable modules.
CO5	Memory Management: Students should understand the concept of memory allocation and deallocation in C programming, including static, automatic, and dynamic memory allocation using functions like malloc(), calloc(), realloc(), and free().
CO6	File Handling: Students should be able to read from and write to files using file handling functions in C, such as fopen(), fclose(), fread(), fwrite(), fseek(), and fprintf().

5. Syllabus.

UNIT –I

Overview of C, Constants, variables & data types Operators and expressions Managing input and output operators, Decision Making and Branching Decision Making and Looping. One – dimensional Arrays and their declaration and Initialisations, Two-dimensional Arrays and their initialisations, Multidimensional Arrays, Dynamic Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings, String – handling functions, Table and other features of Strings.

UNIT -II

Need and Elements for user –defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting of functions, Recursion, Passing arrays and strings to functions, The Scope, Visibility and Life time of variables.

UNIT -III

Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialisation of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

UNIT -IV

Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures, File Management in C.

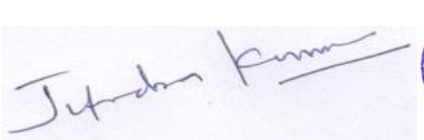
Suggested reading :

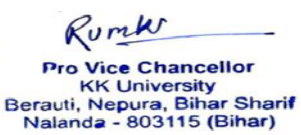
1. E. Balagurusamy – Programming in ANSI C, 3 rd Edn. , TMH, New Delhi ; 2004
2 Programming with C, B.S.Gottfried (TMH)
3. Y. Kanetkar – Let us C, 4 th Edition, BPB Publication , New Delhi; 2002

PROGRAMMING IN C LAB SUB-CODE: BCA1103 CREDIT: 02

A Theory: Variable, Data type, Keyword ,Operator, Hello world Program, Control Structure, Array, Pointer

Week 1: Write a C program to find the sum of individual digits of a positive integer.
Week 2: Write a C program to generate Fibonacci series.
Week 3: Write a C program to generate all the prime numbers between 1 and n is a Value supplied by the user.
Week 4: Write a C program to find the roots of a quadratic equation.
Week 5: Two integer operands and one operator form user, performs the operation and then prints the result.
Week 6: Write a C program to find the factorial of a given integer by using recursive and non-recursive functions.
Week 7: A C program to find both the largest and smallest number in list of integers
Week 8: Write A C- Program to Determine If The Given String Is A Palindrome Or Not
Week 9: Example of Array In C programming to find out the average of 4 integers
Week 10: Write a program in c to Addition of two matrix in C
Week 11: Write a C program to implement the following searching method.
i) Linear search ii) Binary search
Week 12: Write C programs that implement the following sorting methods to sort a given list of integers in ascending order by using Bubble sort.



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School of Engineering & Technology.

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1104
Course Name	Environmental Science
Course Credits	1 (L) + 0(P)= 3
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

The objectives of an environmental science are Understanding Environmental Systems, Awareness of Environmental Issues, Scientific Inquiry and Critical Thinking, Sustainability Principles, Ethical Considerations, Interdisciplinary Perspective, Effective Communication: To develop students' communication skills, both oral and written.

2. **Prerequisite:**

The prerequisites for an environmental science are High School Diploma or Equivalent, Basic Science Courses: Many environmental science programs expect students to have a foundational understanding of basic science concepts. This may include courses in biology, chemistry, physics, and earth science.

3. **Objective of Syllabus:**

The objectives of an environmental science are Understanding Environmental Systems, Awareness of Environmental Issues, Scientific Inquiry and Critical Thinking, Sustainability Principles, Ethical Considerations, Interdisciplinary Perspective, Effective Communication: To develop students' communication skills, both oral and written.

These objectives aim to provide students with a comprehensive understanding of environmental science, equip them with the necessary skills and knowledge to address environmental challenges, and inspire them to become environmentally conscious and engaged citizens.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	**Understanding of Environmental Systems:** Students should gain a comprehensive understanding of the Earth's environmental systems, including the atmosphere, hydrosphere, lithosphere, and biosphere, and the interactions between them.
CO2	**Awareness of Environmental Issues:** Students should become familiar with contemporary environmental issues such as climate change, biodiversity loss,

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	pollution, resource depletion, and their impacts on ecosystems and human societies.
CO3	**Sustainability Principles:** Students should learn about the principles of sustainability and the importance of balancing environmental, economic, and social considerations to meet the needs of present and future generations.
CO4	**Environmental Ethics and Values:** Students should explore ethical frameworks and values related to environmental issues, including concepts such as environmental justice, stewardship, and intergenerational equity.
CO5	**Effective Communication:** Students should develop skills in communicating scientific concepts and environmental information effectively to diverse audiences, including policymakers, stakeholders, and the general public.
CO6	**Interdisciplinary Perspective:** Students should appreciate the interdisciplinary nature of environmental science and recognize the connections between environmental issues and other fields such as biology, chemistry, physics, sociology, economics, and political science.

5. Syllabus.

UNIT -I

Multidisciplinary nature of environmental science, Definition, scope, importance and need for public awareness. Concept of an ecosystem, structure and function of an ecosystem, producer, consumer and decomposer, energy and nutrient flow biogeochemical cycles, food chain, food web, ecological pyramid.

UNIT -II

Segments of environment, sources, pathways and fate of environmental pollutants, causes of environmental pollution, physical, chemical and biological transformation of pollutants, population explosion, environment and human health, human rights, value education, women and child welfare.

UNIT -III

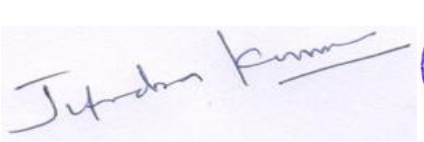
Various segments of atmosphere and their significance, classification of air pollutions, toxic effects, sampling and analysis, stationary and mobile emission, sources and their control, photochemical smog, sulphurous smog, green house effect, global warning, ozone depletion, Air (prevention and control of pollution) Act. Water resources sources of water pollution, various pollutants, their toxic effect, portability of water, municipal water supply, disinfection, characteristics of waste water, primary and secondary waste water treatment, BOD and COD measurement and their significance, rain water harvesting, water shed management, Water (pollution and control) Act.

UNIT -IV

Renewable and nonrenewable resources, Forest resource, consequences of deforestation, floods and draughts, equitable use of resources for sustainable development, Dams benefits and problems, Biodiversity: ecosystem diversity, theans to biodiversity, conservation of biodiversity.

Suggested reading :

1. De A. K., Environmental Chemistry, Wiley Eastern Ltd.



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2. Miller T.G.Jr., Environmental Science, Wadswarth Pulishing Co. (TB)
3. Sharma B.K., 2001, Environmental Chemistry, Goel Publishing House, Meerut
4. Odem, E.P., 1971, Fundamentals of Ecology, W.B.Sannders Co. U.S.A.

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1105
Course Name	Communication Skill
Course Credits	4 (L) + 2(P)= 6
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   This course will encourage students for self awareness,self Development, and will give good communication skill, Leadership knowledge, and will also have knowledge about Ethics.

2. **Prerequisite:**

   Students should have knowledge about Basic English and communication and also about Basic Leading knowledge .

3. **Objective of Syllabus:**

   The objective of this course to help the students to develop as team member, leader and all round professional in the long run. This course would focus on over all personality development of the student and to improve his technical writing and documentation.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Communicate, interact and present his ideas to the other professionals
CO2	Understand and aware of importance, role and contents of soft skills through instructions, knowledge acquisition, demonstration and practice
CO3	Have right attitude in al and behavioral aspects, and build the same through activities.
CO4	Possess right professional and social ethical values.

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CO5	Possess knowledge about Time Management.
CO6	Students will demonstrate the ability to communicate clearly and effectively through spoken language in various contexts, such as presentations, group discussions, and interpersonal interactions.

5. Syllabus.

UNIT -I

Definition, Objectives, Stages of Communication, Essentials of Good/Effective Communication, Benefits of Good Communication, Gaps in Communication, Communication and Information Technology.

UNIT -II

Structure of a Letter, Inquiry Letter, Sales Letter, Order Letter, Complaints, Complaint Handling, Telemarketing. Noting, Routine Letter, Demi-Official Letter Memorandum, Circular, Telegrams, Newsletter.

UNIT -III

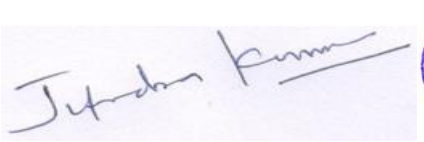
Report Writing, Scientific Paper Writing, Writing Small Paragraphs & Essays, Composition. Sentence Structure, Idiomatic Usage of Language, Tenses, Direct & Indirect Parts of Speech, Active & Passive Voice, Vocabulary.

UNIT -IV

2-3 classic short stories, 2-3 great short stories by Indian writers. Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.

Suggested Reading:

1. Organizations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall India.
2. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.
3. Technical Communication: M. Raman & S. Sharma; Oxford University Press.
4. Business Communication Process and Product: M.E. Guffey; Thomson Learning.
5. Human Behavior at Work; John W New storm & Keith Davis; Tata McGraw Hill.
6. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill
7. Business Communication: R.K. Madhukar; Vikas Publication



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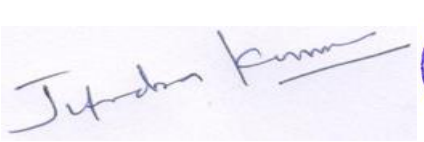
COMMUNICATION SKILL LAB SUB. CODE: BCA1105P CREDIT 02

LIST OF EXPERIMENTS

- Work/Assignments
- SWOT analysis Personal & Career Goal setting – Short term &long term Presentation Skill
- Dining EtiquettesLetter/Application/Notice/Agenda/MinuteswritingReportwriting
- Listening skills using Language laboratory
- Group discussion
- Resume writing



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SEMESTER - II

Program Structure	**BCA (Bachelor of Computer Application)**
Subject Code	**BCA1201**
Course Name	**Mathematics -II**
Course Credits	**4 (L) + 0(P)=4**
Total Course Credit	**134**

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   This course covers foundational topics in discrete mathematics, including set theory, relations, functions, mathematical induction, propositional logic, algebraic structures, and graph theory. It is designed to provide students with a solid understanding of mathematical concepts and techniques that are essential for advanced studies in mathematics, computer science, and related fields.

2. **Prerequisite:**

   Basic knowledge of algebra and number theory. Familiarity with mathematical notation and basic proof techniques.

3. **Objective of Syllabus:**

   The primary objective of this course is to equip students with essential mathematical tools and

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concepts that are foundational for advanced studies in mathematics, computer science, and related fields. Students will learn to apply these concepts to solve complex problems, understand mathematical proofs, and explore the structure and behavior of mathematical systems.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understand and apply operations and laws of sets.
CO2	Utilize the Well-Ordering Principle in mathematical proofs. Develop recursive definitions and understand their applications.
CO3	Understand the syntax and semantics of propositional logic. Evaluate the validity and satisfiability of logical statements.
CO4	Understand and work with algebraic structures with one binary operation, including semi-groups, monoids, and groups.
CO5	Understand the properties of graphs, including degree, connectivity, path, and cycle.
CO6	

5. Syllabus.

UNIT –I

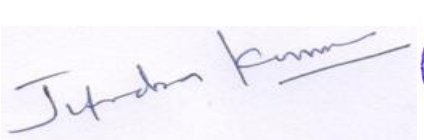
SETS, RELATION AND FUNCTION

Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

UNIT –II

PRINCIPLES OF MATHEMATICAL INDUCTION

The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.



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UNIT –III

PROPOSITIONAL LOGIC

Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT –IV

ALGEBRAIC STRUCTURES AND MORPHISM

Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

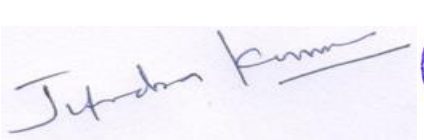
UNIT –V

GRAPHS AND TREES

Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

BOOKS AND REFERENCES:

1. TRUSS, J.K. Discrete Mathematics for Computer Scientists. (ISBN 0-201-175-649) 2nd Edition, Addison Wesley 1998.
2. R.K.Bisht, and H.S.Dhami, Discrete Mathematics, Oxford University Press, First Edition, 2015
3. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill, 5thed, 2003.
4. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications, to Computer Science, TataMc-Graw Hill, 2001.
5. Joe L. Mott, A. Kandel, and T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematics, Prentice Hall of India, 2nd Edition, 2006.
6. N. Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India, 2006.
7. S. Lipschutz, Discrete Mathematics, Tata McGraw Hill, 2005



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1202
Course Name	Data structure Using C
Course Credits	4 (L) + 2(P)= 6
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   To understand the concepts of ADTs, linear data structures (lists, stacks, and queues),
   To implement non-linear data structures (Tree and Graph), get familiarized to sorting and searching algorithms.

2. **Prerequisite:**

To understand the basic knowledge of C programing.

3. Objective of Syllabus:

- To understand the concepts of ADTs
- To Learn linear data structures – lists, stacks, and queues
- To implement non-linear data structures
- To apply Tree and Graph structures
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understand basic data structures such as arrays, strings, and linked lists.
CO2	Study linear data structures such as stacks and queues and understand their diffe
CO3	Critically analyze the various sorting algorithms.
CO4	Understand the concept of memory management.
CO5	Study tree, heap and graphs along with their basic operations
CO6	Study different techniques for solving problems like sorting and searching

5. Syllabus.

UNIT I: LINEAR DATA STRUCTURES – LIST

Abstract Data Types (ADTs) – List ADT – array-based implementation - linked list implementation - singly linked lists - circularly linked lists- doubly-linked lists - applications of lists - Polynomial Manipulation- All operations (Insertion, Deletion, Merge, Traversal).

UNIT II: LINEAR DATA STRUCTURES – STACKS, QUEUES

Stack ADT – Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression - Queue ADT – Operations - Circular Queue – Priority Queue - deQueue – applications of queues.

UNIT III: NON LINEAR DATA STRUCTURES – TREES

Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree - B+ Tree - Heap – Applications of heap.

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UNIT IV: NON LINEAR DATA STRUCTURES - GRAPHS

Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT V: SEARCHING, SORTING AND HASHING TECHNIQUES

Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort – Radix sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TEXT BOOKS:

- Mark Allen Weiss, —Data Structures and Algorithm Analysis in C‖, 2nd Edition, Pearson Education,1997.
- Reema Thareja, —Data Structures Using C‖, Second Edition , Oxford University Press, 2011

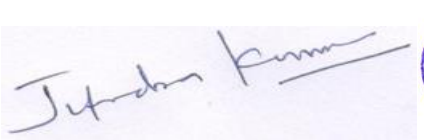
REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, —Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2. Aho, Hopcroft and Ullman, —Data Structures and Algorithms‖, Pearson Education, 1983.
3. Stephen G. Kochan, —Programming in C‖, 3rd edition, Pearson Education.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C‖, Second Edition, University Press, 2008
5. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education.

DATASTRUCTURE UAING C LAB SUB-CODE: BCA1202P CREDIT: 02

LIST OF EXPERIMENT

Week 1: Array implementation of Stack and Queue ADTs
Week 2: Array implementation of Stack and Queue ADTs
Week 3: Linked list implementation of List, Stack and Queue ADTs
Week 4: Applications of List, Stack and Queue ADTs
Week 5: Implementation of Binary Trees and operations of Binary Trees
Week 6: Implementation of Binary Search Trees



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Week 7: Implementation of AVL Trees
Week 8: Implementation of Heaps using Priority Queues.
Week 9: Graph representation and Traversal algorithms
Week 10: Applications of Graphs
Week 11: Implementation of searching and sorting algorithms
Week 12: Hashing – any two collision techniques

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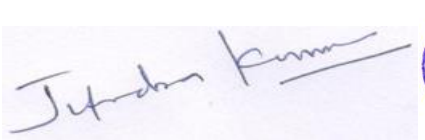
Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1203



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Course Name	Database Management System
Course Credits	3 (L) + 2(P)= 5
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   Introduce students to the fundamental concepts of databases, including data models, schema, instances, and relationships. Teach students about relational databases, including the relational model, SQL (Structured Query Language), normalization, Entity-relationship modeling, functional dependencies, using SQL and RDBMS platforms such as MySQL, Oracle, or SQL Server.

2. **Prerequisite:**

   Having knowledge of data, file, operating system.

3. **Objective of Syllabus:**

   Introduce students to the fundamental concepts of databases, including data models, schema, instances, and relationships. Teach students about relational databases, including the relational model, SQL (Structured Query Language), normalization, and de normalization. Entity-relationship modeling, functional dependencies, and normalization techniques. creating, querying, updating, and managing databases using SQL and RDBMS platforms such as MySQL, Oracle, or SQL Server, maintaining data integrity through constraints, such as primary keys, foreign keys, unique constraints, and check constraints,ACID properties, and concurrency control mechanisms.

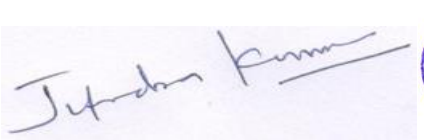
4. **Course Outcome:**

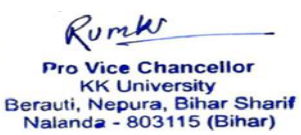
S. No.	Course Outcomes (Cos)
CO1	Understand the basic terminology used in DBMS
CO2	Have an idea of various DBMS software available
CO3	Understand the working of DBMS
CO4	Design tables to be used in a DBMS
CO5	Understand ER-diagrams
CO6	Understand the concept and uses of various concepts related to DBMS

5. **Syllabus.**

UNIT -I

Introduction to DBMS, architecture, administration roles, data dictionary Traditional models, three- level



architecture, hierarchical model, network model and relational model, File organization , Security.

UNIT -II

Relational model – definitions and properties, keys , integrity rules, relational algebra, joins, set operations, Tuple relational calculus. SQL constructs, embedded SQL, Query & Query Optimisation Techniques.

UNIT –III

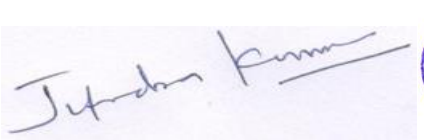
Database design, conceptual, logical and physical models, ER diagram and model, Functional Dependency (Armstrong's Axioms), Normal forms(1NF, 2NF, 3NF, BCNF).

UNIT -IV

Indexing- Primary, Secondary, Multilevel.

Suggested Reading :

1. Data Base System Concepts, Korth, TMH
2. Fundamentals of DBMS,Vig & Walia, ISTE/EXCEL
3. Data Base Management System, A.K. Pujari, ISTE/EXCEL
4. Data Base Management System, Leon, VIKAS 5.Data Base Concepts, Kroenke,PHI
6. Oracle PL/SQL Programming, Feuerstein, SPD/O'REILLY
7. Data Base Management System, V.K. Jain, Wiley Dreamtech 8.SQL PL/SQL for Oracle 8 & 8i,P.S. Deshpande, Wiley Dreamtech



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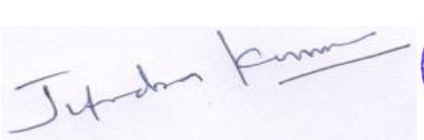
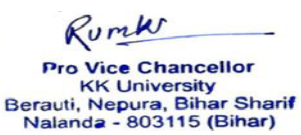
DATABASE MANAGEMENT SYSTEM LAB SUB-CODE: BCA1203P CREDIT: 02

LIST OF EXPERIMENT:

Week 1: Concept design with E-R Model
Week 2: Relational Model
Week 3: Normalization
Week 4: Practicing DDL commands
Week 5: Practicing DML commands
Week 6: Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
Week 7: Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
Week 8: Triggers (Creation of insert trigger, delete trigger, update trigger)
Week 9: Procedures
Week 10: Usage of Cursor



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1204
Course Name	Physics
Course Credits	3 (L) + T(1)=4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

A After the completion of the degree, students would

- be prepared with a varied range of expertise in different aspects of physics.
- acquire solid understanding of both the theory and experimental physics to take up the challenging future problems.
- be better trained professionals to cater the growing demand for interdisciplinary professionals

physicist in industry

2. Prerequisite:

Basic knowledge of physics

3. Objective of Syllabus:

- To provide knowledge and develop an understanding of principles and processes of wave optics, optical communication and fundamentals of wave equation and simple harmonic oscillator.
- To develop the basic skills to apply knowledge by the topics covered in the course to Physics problems.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Students able to explained the behavior of oscillating systems and wave motion.
CO2	Student able to know the various types of Vibration force systems to study their effects .

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CO3	Derive Stoke' s , Greens and Gauss theorems and apply to solve physics problems.
CO4	Understand integration of vectors.

5. Syllabus.

UNIT -I

Wave motion : Longitudinal and transvers waves, wave equation, plane waves, phase velocity, wave packets and group velocity, superposition of waves, equation of motion of simple harmonic oscillator and solution, damped harmonic motion, forced oscillations. Vector and scalar fields, gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statements only).

UNIT -II

Gauss's law in integral and differential form, electric potential and relation with E (SS* - capacitance and electric energy density), dielectrics, three electric vectors, dielectric susceptibility boundary conditions and E and D. Amper's law in integral and differential form, applications, Hall effect, Three magnetic vectors, magnetic permeability and susceptibility, Boundary conditions on B and H. Faraday's law in integral and differential form, (SS – Inductance, Magnetic energy density, continuity equation for charge), Displacement current, Maxwell's equations in free space, electromagnetic wave equation for place waves in a conducting medium, relation between E,B and K, Pointing vector.

UNIT -III

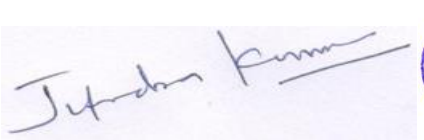
Two – Beam Interference, Interference in Thin Films and Wedge- Shaped Layers, Reflection and Anti - Reflection Coatings, Applications of Interferometry :Newton's rings, Michelson's Interferometer.

UNIT -IV

Fraunhofer Diffraction by Single Slit, Double Slit and Grating, Limit of Resolution, Rayleigh Criterion and Fresnel Diffraction (Qualitative), Polarization: Polarization of light, Malus's law, polarization by reflection, Brewster's low, Double refraction, Analysis of linearly and circularly polarized light, Fresnel's equations and their applications.

Suggested Reading :

1. Mathew N.O. Sadiku, Elements of Electromagnetics, Oxford Univ. Press. (2001)
2. A. Ghatak, Optics, TMH (1992).
3. Resnick, Halliday and Krane, Physics Part-I & II, John Wuley, 5th Ed. (2002)
4. M.R. Srinivasan, Physics for Engineers, New Age International, 1996
5. H.J. Pain, The Physics Vibrations and Waves.



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA1205
Course Name	Chemistry
Course Credits	3 (L) + 1(T)= 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

Chemistry is referred to as the science that systematically studies the composition, properties, and reactivity of matter at atomic and molecular level. The scope of chemistry is very broad. The key areas of study of chemistry comprise Organic chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry. Organic chemistry deals with study of substances containing carbon mostly, inorganic chemistry deals with study of all other elements/compounds/substances and their chemical properties. Physical chemistry deals with applications of concepts, laws to chemical phenomena. Analytical chemistry, in general, deals with identification and quantification of materials

2. Prerequisite:

Students must have Chemistry or Applied Chemistry subject at 10+2 level or Intermediate level.

3. Objective of Syllabus:

- Broad and balance knowledge in chemistry in addition to understanding of key chemical concepts, principles and theories.
- To develop students' ability and skill to acquire expertise over solving both theoretical and applied chemistry problems.
- To provide knowledge and skill to the students' thus enabling them to undertake further studies in chemistry in related areas or multidisciplinary areas that can be helpful for self-employment/entrepreneurship.
- To provide an environment that ensures cognitive development of students in a holistic manner. A complete dialogue about chemistry, chemical equations and its significance is fostered in this framework, rather than mere theoretical aspects.
- To provide the latest subject matter, both theoretical as well as practical, such a way to foster their core competency and discovery learning. A chemistry graduate, as envisioned in this framework, would be 3 sufficiently competent in the field to undertake further discipline-specific studies, as well as to begin domain-related employment.

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4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Acquire knowledge on the bonding theories (VBT, MOT & VSEPR theory) used to explain various types of bonds (ionic, covalent and metallic).
CO2	Deduce the shape (geometry) of molecules using radius ratio rules & VSEPR theory.
CO3	Derive rate expressions for both simple and complex reactions using steady state approximations and to understand temperature dependence on reaction rates.
CO4	Have ideas on varied catalytic processes (both homogeneous and heterogeneous) including enzyme catalysis.
CO5	Understand Nernst distribution law, its applications in extraction processes and limitations.
CO6	Gain insight into the basic principles of UV and IR spectroscopic techniques and their importance in structure determination of organic compounds.

5. Syllabus.

UNIT-I

Trends in periodic properties (ionization energy, electronaffinity, electronegativity),VBT,VSEPR theory, MOTfordiatomicmoleculesandpolyatomicmolecules,coordinationcomplexes&ligands, CFT, colour and magnetism of coordination complexes, spectro chemical series.

UNIT-II

Kinetics of chain reactions, co-parallel reactions, side reactions, fast reactions in solutions, flash photolysis, kinetics of catalytic action (acid base catalysis, biological catalysis), application of catalyst in industriallyimportant processes (Haber's processes, Ostwald process, Bergius process)

UNIT-III

Hess'slaw, entropy, enthalpy and combustion calculations, characterization and application of fossil fuels, solid fuel (carbonization & gasification), liquid fuels (refining, reforming, petrol & diesel, knocking characteristics, octane and cetane number) and gaseous fuels (water gas, producer gas, coal gas and biogas), lubricants and its properties.

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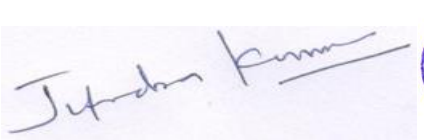
UNIT-IV

Redox process cell, potential and free energy, galvanic cells, electrolysis and Nernst's equation, Fuel cells, and its applications, chemical and electrochemical corrosion, general methods of corrosion prevention (with brief introduction to chemistry of paints,varnishes and enamel).Basic principles of vibrational, rotational and Mossbauer spectroscopy.

Suggested Reading:

1. Appliedchemistryatextbookforengineersandtechnologist,H.D.Gesser,PlenumPulishers.
2. Physical Chemistry:P.W.Atkins
3. InorganicChemistry:J.D.Lee
4. Fundamentalsofmolecularspectroscopy:C.N.Banwell,TMHpublication
5. ComputationalChemistry:E.Lewars,Kluwerpublication
6. EngneeringChemistry:SashiChawla



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School of Engineering & Technology.

Department of Computer Science & Engineering

SEMESTER - III

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2101
Course Name	Cloud Computing
Course Credits	3 (L) + 1(T) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   The course objectives is to equip students with a comprehensive understanding of cloud computing principles, technologies, and practices, preparing them for careers in cloud architecture, management, and application development.

2. **Prerequisite:**

   The prerequisites for understanding and working with cloud computing typically include: Basic Networking Skills, Understanding of Virtualization, Understanding Operating Systems, Knowledge of different types of storage (block, file, object), Awareness of security principles and practices, Understanding web protocols (HTTP, HTTPS) and web server technologies, Basic knowledge of database systems.

3. **Objective of Syllabus:**

   The primary objective of cloud computing is to provide convenient, on-demand access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services). This is typically achieved through the Internet, allowing users to rapidly scale resources up

or down based on their needs. Overall, the objective of cloud computing is to enhance efficiency, reduce costs, and accelerate innovation by leveraging shared resources and advanced technologies delivered over the internet in a scalable and flexible manner

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understanding Cloud Concepts**:** such as virtualization, scalability, elasticity, multi-tenancy, and service models (IaaS, PaaS, SaaS).
CO2	Ability to design and implement cloud architectures, considering factors such as availability, scalability, security, and cost-effectiveness.
CO3	Understanding of cloud security principles, practices, and technologies to protect data, applications, and infrastructure in the cloud environment.
CO4	Understanding Knowledge of different cloud deployment models (public, private, hybrid) and their respective advantages, limitations, and use cases.
CO5	Ability to integrate cloud services with on-premises systems and other cloud services, ensuring seamless data flow and interoperability.
CO6	Ability to Skills to identify and resolve issues related to cloud deployments, performance bottlenecks, security vulnerabilities, and operational challenges.

5. Syllabus.

UNIT -I

Introduction: Objective, scope and outcome of the course. Introduction Cloud Computing: Nutshell of cloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges, Risks and Approaches of Migration into Cloud. Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and economics, Future of the cloud. Networking Support for Cloud
Computing. Ubiquitous Cloud and the Internet of Things

UNIT -II

Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Services models, Data centre Design and interconnection Network, Architectural design of Compute and Storage Clouds. Cloud Programming and Software: Fractures of cloud programming, Parallel and distributed programming paradigms-Map Reduce, Hadoop, High level Language for Cloud.
Programming of Google App engine.

UNIT -III

Virtualization Technology: Definition, Understanding and Benefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms, Hypervisor VMware, KVM, Xen. Virtualization: of CPU, Memory, I/O Devices, Virtual Cluster and Resources Management, Virtualization of Server, Desktop, Network, and Virtualization of data-centre.

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UNIT -IV

Securing the Cloud: Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture . Legal issues in cloud Computing. Data Security in Cloud: Business Continuity and Disaster Recovery , Risk Mitigation

, Understanding and Identification of Threats in Cloud, SLA-Service Level Agreements, Trust Management

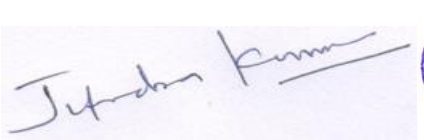
UNIT -V

Cloud Platforms in Industry: Amazon web services , Google AppEngine, Microsoft Azure Design, Aneka: Cloud Application Platform -Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite

Image Processing, CRM

TEXT BOOKS:

- Cloud Computing from Beginning to End by Ray J Rafaels
- Cloud Computing: Concepts, Technology & Architecture by Zaigham Mahmood, Ricardo Puttini, Thomas ErlOpens a new window
- Cloud Computing Bible by Barrie Sosinsky.
- Cloud Computing for Dummies by Judith S. Hurwitz, Robin Bloor, Marcia Kaufman, Fern HalperOpens a new window



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	**BCA (Bachelor of Computer Application)**
Subject Code	**BCA2102**
Course Name	**Operating System**
Course Credits	**4 (L)**
Total Course Credit	**134**

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This course will introduce the core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output device management and security. The goal of the programming assignments is to give students some exposure to operating system code

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2. Prerequisite:

To understand the basic computer organization, operating system structures, processes and threads.

3. Objective of Syllabus:

This course Operating Systems is an essential part of any Computer-Science education. The purpose of this course is to understand the mechanisms of the Operating Systems like Process Management, Process Synchronization, Memory Management, File System Implementation, Storage Structures used in OS and Protection Principles. How effectively the OS is utilizing the CPU resources with the help of these mechanisms. Learn the fundamentals of Operating Systems, learn the mechanisms of OS to handle processes and threads and their communication. To learn the mechanisms involved in memory management in contemporary OS. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Will be able to control access to a computer andthe files that may be shared.
CO2	Demonstrate the knowledge of the componentsof computer and their respective roles in computing.
CO3	Ability to recognize and resolve user problemswith standard operating environments
CO4	Gain practical knowledge of how programming languages, operating systems, and architecturesinteract and how to use each effectively
CO5	Understand Multiprocessor system, classification and types, OS functions and requirements, Introduction to parallel computing

5. Syllabus.

UNIT -I

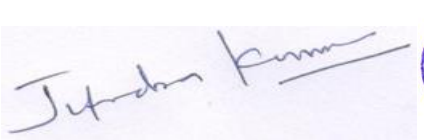
Importance of OS, Basic concepts and terminology, types of OS, different views, journey of a command execution, design and implementation of O,S Process: Concept and views, OS view of processes, OS services for process management, scheduling algorithms, performance evaluation.

UNIT –II

Inter process communication and synchronization, mutual exclusion, semaphores, hardware support for mutual exclusion, queuing implementation of semaphores, classical problem of concurrent programming, critical region and conditional critical region, monitors, deadlocks.

UNIT -III

Resource manager, Memory management, files management, processor management, device



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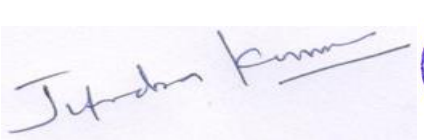
management Security and protection, authentication, protection.

UNIT -IV

Multiprocessor system, classification and types, OS functions and requirements, Introduction to parallel computing, multiprocessor interconnection synchronization.

Suggested Reading:

1. Operating Systems, Galvin, John Wiley
2. Operating Systems , Milankovic, TMH
3. An Introduction to Operating System, Bhatt,PHI
4. Modern Operating System, Tannenbaum,PHI
5. Guide to Operating Systems, Palmer, VIKAS
6. Operating Systems,Prasad,Scitech



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2103
Course Name	Electronic Commerce & Application
Course Credits	3 (L) +1 (T)
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

2. Course Overview:

A course overview of Electronic Commerce (e-commerce) typically covers a range of topics related to the buying and selling of goods and services over the internet. Like Introduction to E-Commerce, E-Commerce Infrastructure, E-Commerce Business Models (Business-to-Consumer (B2C), Business-to-Business (B2B), Consumer-to-Consumer (C2C) models, E-Commerce Marketing and Advertising, Legal and Ethical Issues in E-Commerce (Online contracts and electronic signatures, Privacy and data protection, Intellectual property rights and digital content)

2. Prerequisite:.

Electronic Commerce (e-commerce) is a broad field that encompasses various technologies and applications **like** Understanding of Business Concepts,Knowledge of Internet and Web Technologies, E-commerce Platforms and Tools: Familiarity with e-commerce platforms (like Shopify, WooCommerce, Magento), Legal and Regulatory Issues, Digital Marketing and Ethical Considerations.

3. Objective of Syllabus:

The objectives of electronic commerce (e-commerce) and its applications are multifaceted, aiming to leverage digital technologies to facilitate and enhance various aspects of business and consumer interactions. Here are some primary objectives like Facilitate Business Transactions, Expand Market Reach, Increase Convenience and Accessibility, Reduce Costs, Enhance Customer Experience, Enable Market Segmentation and Targeting, Ensure Security and Trust.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Students should be able to analyze and compare different e-commerce business models (e.g., B2B, B2C, C2C, etc.) and understand their respective advantages, challenges, and applications.

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CO2	Students should gain practical skills in using and managing e-commerce platforms such as Shopify, WooCommerce, Magento, etc.
CO3	Students should develop an understanding of digital marketing strategies specific to e-commerce, including SEO (Search Engine Optimization), SEM (Search Engine Marketing), social media marketing, email marketing, and content marketing.
CO4	Students should learn principles of website design optimized for e-commerce, focusing on creating intuitive user interfaces (UI) and enhancing user experience (UX) to maximize conversions and customer satisfaction.
CO5	Students should understand the legal and regulatory issues affecting e-commerce operations, including consumer protection laws, data privacy regulations, intellectual property rights, and international trade regulations.
CO6	Students should comprehend different online payment systems, their functionalities, and security protocols

5. Syllabus.

UNIT -I

E-commerce: The revolution is just beginning, The visions and forces behind E-commerce, Understanding E-commerce. E-commerce business models, Major business-to-consumer (B2C) business models, Major business-to-business (B2B) business models, Business models in emerging E-commerce areas, How the internet and the Web change business.

UNIT -II

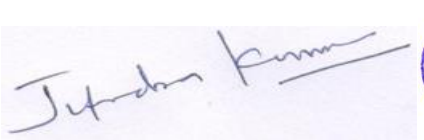
The Internet, Technology background, The internet today, The world wide web. A systematic approach, choosing server software, choosing the hardware for an E-commerce site, other E- commerce site tools. The E-commerce security environment, Security threats in the E-commerce environment, Technology solutions, Policies, Procedures and Laws.

UNIT -III

Payment systems, Credit card E-commerce transactions,E-commerce digital payment systems in the B2C arena, B2B payment systems.

UNIT -IV

Understanding ethical, social, and political issues in E-commerce, Privacy and information rights, Intellectual property rights, Governance, Public safety and welfare.



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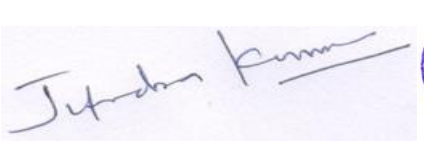
Suggested Reading :

1. K.C. Laudon & C.G. Traver, E-commerce, Pearson Education, 2003
2. R. Kalakota & A.B.Whiilston-' Frontiers of Electronic Commerce, Pearson Education- 2006.
3. K.K.Bajaj & D.Nag- E-Commerce, Tata McGraw Hill, New Delhi, Second Edition.



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2104
Course Name	Object Oriented Programming
Course Credits	3 (L) + 3 (P) = 6
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

3. Course Overview:

Object-Oriented Programming or OOPs refers to languages that use objects in programming. Object-oriented programming aims to implement real-world entities like inheritance, hiding, polymorphism, etc in programming. The main aim of OOP is to bind together the data and the functions that operate on them so that no other part of the code can access this data except that function.

2. Prerequisite:

Basic understanding of programming concepts: Students should be familiar with fundamental programming concepts such as variables, control structures (e.g., loops, if-else statements), and data types. Familiarity with at least one programming language.

3. Objective of Syllabus:

To understand object oriented programming through C++.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Gain the basic knowledge on Object Oriented concepts.
CO2	Ability to develop applications using Object Oriented Programming Concepts.
CO3	Ability to implement features of object oriented programming to solve real world problems.
CO4	Ability to Gain Virtual Functions and Runtime Polymorphism

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CO5	Gain knowledge about Passing parameters to base Class Constructors, Granting access, Virtual base classes.
CO6	Ability to implements file handling & templates

5. Syllabus.

UNIT-I

Introduction: Basic concepts of OOP Benefits of OOP, Object Oriented Language , Structure of C++ Program ,Compiling & Linking, Operators & Expressions Concepts, Arrays & Structures, functions.

UNIT-II

Classes & Object: Specifying a class, Define member function Define member function Scope of class and its member, Nested Class Data hiding & encapsulation Friend function Array within a Class array of object as function argument Function returning object, static member.

UNIT-III

Constructors and Destructors : Constructor function Parameterized multiple constructor, Default constructor, copy constructor, Data conversion between objects of different classes Destructor function, Polymorphism, function, Overloading, Operator overloading.

UNIT-IV

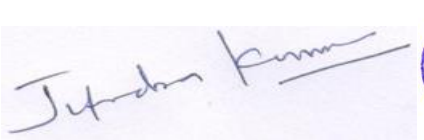
Inheritance, Pointer & Virtual function : Define derived classes, single inheritance, multilevel inheritance, Hierarchical inheritance, Hybrid Inheritance Pointers to objects, this pointer Pointers to derived class, Virtual function, Pure Virtual function, Abstract classes.

UNIT-V

File I/O & Templates :Files streams, Opening & closing a file Read () & write() functions, Detectingend-of-file Seekp(), seekg(), tellg(), tellp() function introduction to Templates & Exception, Creating and handling Templates and Exception in OOP, Standard template Library.

Suggested Reading :

1. Object Oriented Programming in C++ : StroutStrups.
2. Programming with C++ : Venugopal .
3. Programming with C++ : D Ravichandran
4. Let us C++ : Yashwant Kanetkar.
5. C++ and OOPs Paradigm by Debasish Jana (PHI)
6. OOP-P Sengupta & B.B. Choudhari (PHI)
7. OOP with C++ by M.P. Bhave & S. A. Patekar (Pearson Education)
8. OOP with C++ : Poonamchanda Sarang (PHI)



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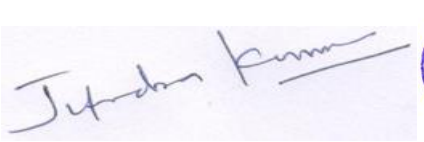
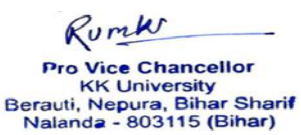
OBJECT ORIENTED PROGRAMMING LAB SUB-CODE: BCA2104P CREDIT: 03

List of Experiment:

1 Write a C++ program to find the sum of the given variables using function with default arguments.
2 Write a C++ program to find the value of a number raised to its power using call by value.
3 Write a C++ program to implement the concept of Call by Address.
4 Write a program in C++ to implement the concept of call by reference.
5 Write C++ program to implement inline function.
6 Write a program in C++ to display product detail using classes with array as data members.
7 Write a program in C++ implements the concept of class with constant data member.
8 Write a program in C++ to implement the concept of class with static member functions.
9 Write a C++ program to implement the friend function concept.
10 a) Write a C++ program to implement the concept of unary operator overloading using c++.
b) Write a C++ program to implement the concept of Binary operator overloading.
11 Write a C++ program to implement the concept of Function Overloading.
12 a) To implement single inheritance using c++.
b) To write a C++ program to implement multiple inheritance.
c) To write a C++ program to implement multilevel inheritance.
13 a) Write a C++ program to implement the concept of class template.
b) Write a C++ program for swapping two values using function templates



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2105
Course Name	Dot Net Technology
Course Credits	3 (L) + 3 (P) = 6
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

4. Course Overview:

This overview covers the foundational aspects of .NET technology, highlighting its versatility and broad application across various domains of software development.

2. Prerequisite:

Having knowledge of C Programing and OOP's concepts.

3. Objective of Syllabus:

The objectives of .NET technology encompass both technical and practical goals aimed at enabling developers to build robust, scalable, and secure applications efficiently.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Gain a strong understanding of at least one primary .NET language such as C#. Develop proficiency in its syntax, data types, control structures, and object-oriented programming concepts.
CO2	Comprehend the architecture of the .NET framework, including the Common Language Runtime (CLR), Base Class Library (BCL), and Managed Code.
CO3	Acquire skills in building web applications using ASP.NET framework. Understand ASP.NET MVC (Model-View-Controller) architecture and ASP.NET Web API.
CO4	Develop proficiency in data access using ADO.NET for traditional database operations with SQL Server or other databases.
CO5	Learn to create Windows desktop applications using Windows Forms or Windows Presentation Foundation (WPF).

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CO6	Apply software development methodologies (e.g., Agile) and best practices in .NET development projects.

5. Syllabus.

UNIT-I

Introduction to .Net, .Net Framework Features & Architecture, CL, Common Type System, MSIL, Assemblies: Types of Assemblies, Class Libraries. Event Drive Programming, Methods and Events Related with Mouse and Keyboard. Programming into Visual Studio, Types of Project in .Net, IDE of VB.Net- Menu Bar, Toolbar, Project Explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate Window, ASP& HTML Forms

UNIT- II

the VB.Net Language- Variables, Declaring Variables, Data Types, Scope & Lifetime of a Variable, Arrays, Types of Array, Control Array, Subroutine, Functions, Passing Argument to Functions, Optional Argument, Returning Value from Function. Control Flow Statements: Conditional Statement, Loop Statement. Forms: Loading, Showing and Hiding Forms, Working with Multiple Forms, Controlling one Form within Another, Overview of C#, Structure of C# Program, C# in .Net.

UNIT- III

GUI Programing with Windows Form with Properties, Methods and Events: Text Box Control, Label Control, Button Control, List box, Combo Box, Checked Box, Picture Box, Radio Button, Pannel, Scroll Bar, Timer Control, Adding Controls At Runtime, Common Dialog Control: File, Save, Print, Help. Designing Menus, MDI Forms, Overview of Dynamic Web Page, Asp.Net Controls, Applications, Web Servers, Web Form Controls, Server Controls, Client Controls Adding Controls to a Web Form, Form Validation Controls: Client Side Validation, Server Side Validation

UNIT- IV

ADO, .Net Architecture, Create Connection, Accessing Data Using Data Adapters and Datasets, Using Command & Data Reader, Data Bind Controls, Displaying Data in Data Grid. Data Form Wizard, Processing SQL& Access Database Using Ado.Net Object Model, Connection Object, Command Object, Add, Delete, Move & Update Records to Dataset, Executing Queries

UNIT- V

XML in .Net, XML Basics, Attributes, Fundamental Xml Classes: Document, Textwriter ,Textreader, XML Validations, XML in ADO, .Net, the XML data document. Web Services: State Management- View State, Session State, Application State, Web Service Description Language, Building & Consuming a Web Service. Web Application Deployment,
Caching

Reference Books:

1. Steven HolznerVB.Net Programming-Black Book-Dreamtech Publications
2. Evangelos Petroutsos Mastering VB.Net - BPB Publications
3. Mathew Macdonald-The Complete Reference Asp.Net-TMH

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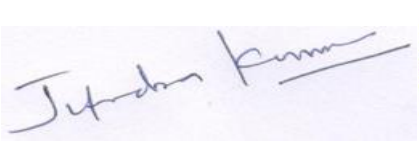
4. Professional ASP.Net- Wrox Publication
5. Stephen Walther Active Server Pages 2.0 (Unleashed) -Techmedia
6. Eric a. Smith Asp 3 Programming Bible: IDG Books
7. C# Programming-Wrox Publication
8. Matt Telles-C# Programming Black Book-Dreamtech Publication



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DOT NET TECHNOLOGY LAB **SUB-CODE: BCA2105P** **CREDIT: 03**

List of Experiment:

1 Program to display the addition, subtraction, multiplication and division of two number using console application.

2 Program to display the first 10 natural numbers and their sum using console application.

3 Program to display the addition using the windows application.

4 Write a program to convert input string from lower to upper and upper to lower case.

5 Write a program to simple calculator using windows application.

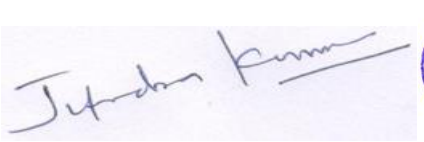
6 Write a program working with Page using ASP.Net.

7 Write a program working with forms using ASP.NET.

8 Write a program to connectivity with Oracle database.

9 Write a program to access data source through ADO.NET.

10 Write a program to manage the session.



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SEMESTER - IV

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2201
Course Name	Artificial Intelligence
Course Credits	3 (L) + 1 (T) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

7. Course Overview:

The primary objective of this course is to introduce the basic principles Techniques, and applications of. Artificial Intelligence, students will get a basic knowledge about Searching techniques like hill climbing,A* Algorithm, AO

2. Prerequisite:

To understand the basic knowledge of Reasoning, Mathematics, Psychology and Learning Techniques.

3. Objective of Syllabus:

- The primary objective of this course is to introduce the basic principles
- techniques, and applications of. Artificial Intelligence
- In this course, students will get a basic introduction to the building blocks and components of artificial intelligence
- learning about concepts like algorithms.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	To understand Introduction to AI, Overview of AI, Problems of AI, AI technique, Searching techniques like hill climbing, A* Algorithm, AO*.
CO2	Apply AI algorithms to solve real-world problems.
CO3	Understand the principles of machine learning.
CO4	To understand Problem in representing knowledge, Knowledge representation propositional and predicate logic, resolution.
CO5	Ability to understand Probabilistic reasoning, Baye's Theorem, Semantic networks

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	logic, forward and backward reasoning.
CO6	Ability to understands Learning, various techniques in Learning, Introduction to Neural networks, application of Neural network, common sense and reasoning.

5. Syllabus.

UNIT -I

Introduction to AI and Intelligent agent: Different Approach of AI, Problem Solving : Solving Problems by Searching, Uninformed search, BFS, DFS, Iterative deepening, Bi directional search, Hill climbing, Informed search techniques: heuristic, Greedy search,A* search, AO* search, constraint satisfaction problems.

UNIT -II

Game Playing: Minimax, alpha-beta pruning, jug problem, chess problem, tiles problem

UNIT -III

Knowledge and Reasoning: Building a Knowledge Base: Propositional logic, first orderlogic, situation calculus. Theorem Proving in First Order Logic. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.

UNIT -IV

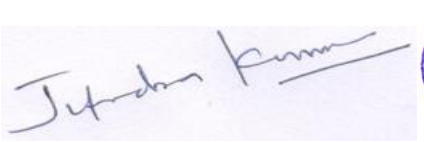
Learning: Overview of different forms of learning, Supervised base learning: LearningDecision Trees, SVM, Unsupervised based learning, Market Basket Analysis, Neural Networks.

UNIT -V

Introduction to Natural Language Processing: Different issue involved in NLP, ExpertSystem, Robotics.

TEXTBOOKS / REFERENCES

1. Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
2. Introduction to AI & Expert System: Dan W. Patterson, PHI.
3. Artificial Intelligence by Luger (Pearson Education)
4. Russel & Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall



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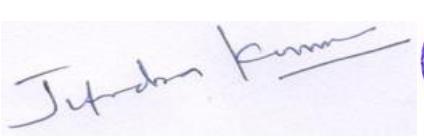

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2202
Course Name	Software Engineering
Course Credits	3 (L) + 2(P) = 5
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   This course will introduce the knowledge about software and software design Life cycle. student will come to know different software model and its specific uses,willalso get knowledge about project management .

2. **Prerequisite:**

   Basic knowledge about software its types and uses.

3. **Objective of Syllabus:**

   This course Software engineering is an essential part of any Computer-Science education. The purpose of this course is to understand the mechanisms of the software engineering like software Management, software Model etc.To use different models like COCOMO to minimize cost,use of LOC in software engineering.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Knowledge about different software models.
CO2	Demonstrate the knowledge about different testing tools used in software.
CO3	Gain knowledge of Cocomo Model,Loc in softwares etc.
CO4	To outline the need for Software Project Management
CO5	To highlight different techniques for software cost estimation and activity planning.

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5. Syllabus.

UNIT -I

Characteristics, Emergence Engineering, Software Metrics & Models, Process & Product Metrics. Software Life Cycle Models:Waterfall, Prototype and Spiral Models and their of Software Comparison.

UNIT -II

Size Estimation- LOC and FP Metrics, Cost Estimation- Delphi and Basic COCOMO, Introduction to Halstead's Software Science, Staffing Level Estimation- Putnam's Model. SRS Documents, their Characteristics and Organization.

UNIT -III

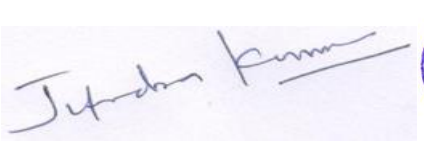
Classification, Software Design Approaches, Function Oriented Software Design, Structured Analysis-Data flow Diagrams and Structured Design, Introduction to Object Oriented Design. Testing.

UNIT -IV

Unit Testing, Block Box Testing, White Box Testing, Debugging, Program Analysis Tools, System Testing.

Suggested Reading:

1. Rajib Mall -Fundamentals of Software Engineering, Prentice Hall of India, New Delhi,2005
2. Pankaj Jalote- An Integrated Approach to Software Engineering, 3 rd Edition, Narosaublishing House, New Delhi,2005
3. Richard Fairley- Software Engineering Concepts, Tata McGraw Hill, New Delhi, 2006



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SOFTWARE ENGINEERING LAB SUB-CODE: BCA2202P CREDIT: 02

Week 1. Write down the problem statement for a suggested system of relevance.

Week 2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.

Week 3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.

Week 4. To perform the user's view analysis for the suggested system: Use case diagram.

Week 5. To draw the structural view diagram for the system: Class diagram, object diagram.

Week 6. To draw the behavioral view diagram : State-chart diagram, Activity diagram

Week 7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram

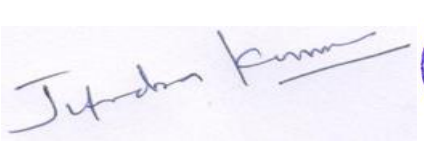
Week 8. To perform the implementation view diagram: Component diagram for the system.

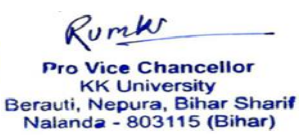
Week 9. To perform the environmental view diagram: Deployment diagram for the system.

Week 10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.

Week 11. Perform Estimation of effort using FP Estimation for chosen system.

Week 12. To prepare time line chart/Gantt Chart/PERT Chart for selected software project.



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2203
Course Name	Computer Architecture
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This course will introduce the core concept of computer Architecture .structure of Bus in computer main goal of this subject is to understand Hard ware and Architecture of computer.

2. Prerequisite:

To understand the basic computer architecture and its functions.

3. Objective of Syllabus:

This subject Computer Architecture & organization is the core subject of computer science it deals with Hardware and basic conceptual architecture of Computer.
In this subject student will learn about arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit and pipeline,different types of memory and Addressing modes. Gain knowledge about parallelism and multi-core processors understand the memory hierarchies, cache memories and virtual memories & different ways of communication with I/O devices.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	To learn the basic structure and operations of a computer.
CO2	To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit
CO3	To learn the basics of pipelined execution. • To understand parallelism and multi-core processors.
CO4	To understand the memory hierarchies, cache memories and virtual memories.

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CO5	To learn the different ways of communication with I/O devices.

5. Syllabus.

UNIT –I

Microprocessors (8085 features), bus structure, Data representation, Register transfer and micro-operations, Central processing Unit, Pipeline and vector processing.

UNIT -II

Computer arithmetic, Input-output organisation, Memory organisation, CPU architecture, instruction format, addressing mode, stacks and handling of interrupts.

UNIT -III

Basic computer organisation and design, programming the computer with assembly language (same basic applications), Micro-programmed control.

UNIT -IV

Memory Hierarchy, Associative Memory, Cache Memory.

Suggested Reading :

1.Computer Organization, Hamacher, TMH

2.0000 to 8085 : Introduction to Microprocessors for Engineers & Scientists,Ghosh & Sridhar,PHI
3.Computer Organization & System Software, EXCEL BOOKS

4.System Architecture, Burd, VIKAS

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2204
Course Name	Basic Electronic
Course Credits	3 (L) + 2 (P) = 5
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   Basic Electronics courses typically provide a foundation for understanding electronic devices and circuits, preparing students for further studies in electrical engineering, computer engineering, or related fields. Hands-on laboratory sessions and projects often complement theoretical knowledge, enhancing practical skills and troubleshooting abilities in electronic design and analysis.

2. **Prerequisite:**

   To effectively understand and succeed in a Basic Electronics course, students should ideally have a solid foundation in certain prerequisite knowledge and skills like **(**Mathematics, Physics, Basic Circuit Theory, Safety Awareness).

3. **Objective of Syllabus:**

   The objectives of a Basic Electronics course typically aim to provide students with a foundational understanding of electronic principles, components, and circuits like Fundamental Concepts, Electronic Components, Circuit Analysis, Operational Amplifiers, Digital Electronics.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Demonstrate knowledge of fundamental electrical concepts such as voltage, current, resistance, and power.
CO2	Ability to apply Ohm's Law and Kirchhoff's Laws to analyze DC and AC circuits. Also Analyze simple series, parallel, and series-parallel circuits to calculate voltages, currents, and power.
CO3	Ability to describe the operation of semiconductor materials and PN junctions.

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CO4	Understand the characteristics and applications of operational amplifiers.
CO5	Understand to Define digital signals and logic levels and Analyze and design basic digital circuits using logic gates and flip-flops.
CO6	Ability to Solve problems related to electronic circuits using analytical and critical thinking skills.

5. Syllabus.

UNIT -I

The Three Kind of Formulas, Approximations, Voltage Sources, Current Sources, Thevenin's Theorem, Norton's Theorem, Troubleshooting.

UNIT -II

Conductors, Semiconductors, Silicon Crystals, Intrinsic Semiconductors, Two Types of Flow, Doping a Semiconductor, Two Types of Extrinsic Semiconductors, TheUnbiased Diode, Forward Bias, Reverse Bias.

UNIT -III

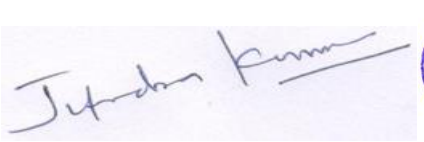
Basic Ideals, the Ideal Diode, The Second Approximation, The Third Approximation. The Half- Wave Rectifier, The Transfer, The Full-Wave Rectifier, The Bridge Rectifier. The Unbiased Transistor, The Biased Transistor, Transistor currents, The CE Connection.

UNIT -IV

Variations in Current Gain, The Load Line, The Operating Point, Recognizing Saturation, The Transistor Switch, Emitter Bias. Base-Biased Amplifier, Emitter-Biased Amplifier, Small-Signal Operation. Voltage Gain, The Loading Effect of Input Impedance.

Suggested Reading:

1. Albert Paul Malvino- Malvino Electron Principles, TMH, Sixth Edition – 1999.
2. B.P. Singh & R. Singh – Electronic Devices and Integrated Circuits, Pearson Education-2006.
3. Electronic devices and circuit theory by Boylestad and Nashelsky, Pearson
4. Electronic principle by Albert Malvino & Davis J Bates, TMH
5. Art of electronics by Paul H Horowitz, Oxford.



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BASIC ELECTRONICS LAB SUB-CODE: BCA2204P CREDIT: 02

Week 1. Verification of Gates

Week 2. Half/Full Adder/Subtractor

Week 3. Parallel Adder/Subtractor

Week 4. Excess-3 to BCD & Vice Versa

Week 5. Binary-Grey & Grey-Binary Converter

Week 6. Flip-Flops

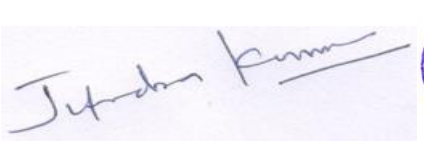
Week 7. Counters

Week 8. Shift Registers

Week 9. Johnson/Ring Counters

Week 10. MUX/DEMUX using only NAND Gates

Week 11. Encoder/Decoder



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA2205
Course Name	Managerial Economics
Course Credits	3 (L) +1 (T) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

Managerial Economics is a branch of economics that applies microeconomic analysis to decision-making in business and management. It focuses on the practical application of economic theories and tools to solve managerial problems and optimize decision outcomes within firms.

2. Prerequisite:

To successfully engage with Managerial Economics, students should ideally have a foundation in several key areas of economics and quantitative analysis.

3. Objective of Syllabus:

The objectives of Managerial Economics revolve around equipping students or practitioners with the analytical tools and economic theories necessary to make informed managerial decisions within business contexts.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Ability to demonstrate a thorough understanding of microeconomic principles and how they apply to managerial decision-making.
CO2	Ability to apply economic concepts and analytical tools to analyze business problems and make informed decisions.
CO3	Understand to utilize quantitative techniques such as marginal analysis, optimization methods, and economic modeling to solve managerial problems.
CO4	Ability to analyze production functions and cost structures to determine optimal production levels and cost minimization strategies.
CO5	Understand to apply risk analysis techniques to evaluate and manage uncertainty in business decisions.

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CO6	Ability to evaluate investment opportunities using capital budgeting techniques (NPV, IRR, payback period) to maximize returns and minimize risk.

5. Syllabus.

UNIT -I

Meaning, nature, scope and significance of economics Consumer Behaviour. Utility approach, Law of diminishing marginal utility. Law of equip marginal utility.

UNIT -II

Indifference curve approach, Consumer equilibrium income, prices & substitution effects. Revealed preference theory of law of Demand, Elasticity of demand and its measurements, methods of Demand forecasting.

UNIT -III

Concepts of cost and revenue, Short run and long run cost curves, Concept of total, average and marginal revenues. Relationship between average revenue, marginal revenue and elasticity of demand.

UNIT -IV

Price determination under perfect, oligopoly, duopoly, monopoly, monopolistic competition price descrimination. Investment decision – capital building, public investment decision, risk and uncertainty.

Suggested Reading :

1. Elements of Economics – Dewett & Dewett
2. Managerial Economics – Vartshney & Maheswari
3. Managerial Economics – J.G.Verma
4. Economical Analysis for Management Decisions – T.W.Elliot
5. Business Economics – V.G.Mankar
6. Managerial Economics – N.F. Dufty

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SEMESTER - V

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3101
Course Name	Internet & Web Technology
Course Credits	3 (L) + 2(P) = 5
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This Subject is useful for Making own Web page and how to host own web site on internet. Along with that Students will also learn about the protocols involve in internet technology.

2. Prerequisite:

To understand the basic knowledge of computer, Keyboard, Note Pad, Internet, Browser and operating system.

3. Objective of Syllabus:

- To Understand internet , web server ,IP Address and communication over internet
- Learn complete knowledge of HTML
- To Understand the basic concepts and syntax of Cascading Style sheet (CSS) and their uses.
- To Understand operations using JavaScript
- Understand XML
- Learn Database Connectivity with MySQL - Servlets, JSP and PHP
- Design Web Pages using HTML, CSS, JavaScript and PHP.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understand internet , web server ,IP Address and communication over internet
CO2	Have a knowledge of HTML
CO3	Understand the basic concepts of HTML Tags and their uses
CO4	Design Web Pages using HTML

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CO5	Understand operations using JavaScript
CO6	Understand XML.

5. Syllabus.

UNIT –I

Basic concepts, Communication on the Internet, Internet Domains, Internet Server Identities, Establishing Connectivity on the Internet, Client IP Address, A Brief Overview of TCP/IP and its Services, Transmission Control Protocol, Web Server , Web Client, Domain Registration.

UNIT –II

HTML, HTML Tags, Commonly Used HTML Commands, Title and Footers, Text Formatting, Text Style, Lists, Adding Graphics to HTML Documents, Tables,Linking Documents, Frames.

UNIT –III

Java Script in Web Pages, Advantages of Java Script, Advantages of Java Script, Data Types and Literals, Type Casting , Java Script Array, Operators and Expression, Conditional Checking , Function, User Defined Function.

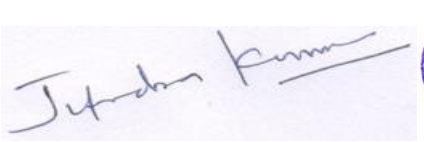
UNIT –IV

SGML, XML, XML and HTML, Modeling XML Data, Styling XML with XSL, XHTML.

Suggested Reading :

1. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication
2. Michel Morrison -HTML and XML for Beginners, PHI, New Delhi- 2001
3. H.M Dietal and P.J Dietal -Java How to Program, PHI, New Delhi- 2005

Java Server Side Programming -WROX Publication



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INTERNET & WEB TECHNOLOGY LAB SUB-CODE: BCA3101P CREDIT: 02

LIST OF EXPERIMENTS:

Week 1: Home page Development static pages (using Only HTML) of an online Book store.

Week 2: Create a Login page.

Week 3: Validate the Registration, user login and payment by credit card pages using JavaScript.

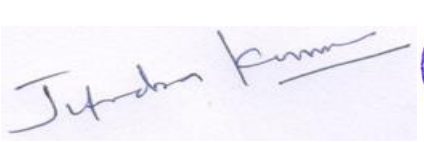
Week 4: To write a program, which takes user id as input and displays the user details by taking the user information from the XML document.

Week 5: To create a JavaBean so that it converts value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.

Week 6: To create a simple Bean with a label - which is the count of number of clicks and a Bean Info class such that only the "count" property is visible in the Property Window.

Week 7: To create two Beans Traffic Light which implemented as a Label with only three background colours- Red, Green, Yellow and Automobile which is implemented as a Textbox which states its state/movement with above stated conditions.

Week 8: To convert the static web pages online library into dynamic web pages using servlets and cookies.



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3102
Course Name	Java Programming
Course Credits	4 (L) + 2(P) = 6
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   To understand the basic concepts of platform independent object oriented Programming language, writing the program using Applet and application, writing programs using exception handling, multithreading and database connectivity.

2. **Prerequisite:**

   To understand the basic knowledge of programing and Basic Knowledge of OOP's.

3. **Objective of Syllabus:**

   - To understand the basic concepts and fundamentals of platform independent object oriented language.
   - To demonstrate skills in writing the program using Applet and application
   - To demonstrate skills in writing programs using exception handling techniques and multithreading.
   - To understand streams and efficient user interface design techniques.
   - Able to skills in writing a program for database connectivity.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Able Use the syntax and semantics of java programming language and basic concepts of OOP.
CO2	Able to write general Program in Java.
CO3	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
CO4	Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.

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CO5	Able to develop Applet Programing
CO6	Able to design event driven GUI and web related applications which mimic the real word Scenarios

5. Syllabus.

UNIT-I

Basics of Java : History and Basics of Java, Java Environment, JDK Tools, Java Virtual Machine, Java Program Structure, Java Language- Tokens, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Statements - Decision Making, Branching and Looping, Labeled Loops Statement, Jump Statements: Break, Continue, and Return, Command Line Argument.

UNIT-II

Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Static Members, Nesting of Methods, Inheritance and Polymorphism: Basics Types, Extending a Class, Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Abstract Methods and Classes, Visibility Control.

UNIT-III

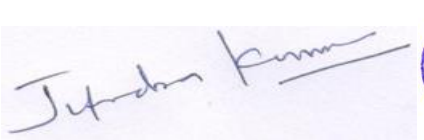
One and Two Dimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling: Introduction to Exception Handling, Try-Catch, Finally, Throws, Java Thread Model: Life Cycle of a Thread, Thread Class, Runnable Interface

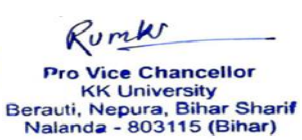
UNIT-IV

Applet Programming : Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Swing Classes, Event Handling, AWT Programming: Working with Windows, Graphics and Text, Using AWTControls, Layout Managers and Menus, Handling Image, Animation, Sound and Video. Java Swing: Japplet, Icons and Labels, Text Fields, Buttons, Radio Buttons, Check Boxes, Combo Boxes, List Boxes, Tabbed and Scroll Panes, Tables. Event Handling:

UNIT-V

I/O Stream: Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, Textfile Vs. Binary File, Standard I/O Streams, and Random Access File, Serialization. Database Programming Using JDBC:-Introduction to JDBC, JDBC Drivers,Types of JDBC Drivers, Connecting with Database. J2EE: Introduction ofJ2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet, Servlet Life Cycle, Developing and Deploying Servlets.



Reference Books:

1. E. Balagurusamy, "Programming with Java, a Primer", TMH, ISBN-13: 978-0-07-061713-1.
2. Patrick Naughton and Herbert Schildt, "Java: the Complete Reference", TMH Publication.
3. Yashavant kanetkar, "Let us Java", BPB Publications.
5. Cay Horstmann, "Big Java", Wiley Publication
6. Peter Norton, "Java Programming", Techmedia Publications.
7. Joseph Weber, "Using Java 1.2", PHI

JAVA PROGRAMMING LAB **SUB-CODE: BCA3102P** **CREDIT: 02**

LIST OF EXPERIMENTS:

Week 1: Write a java program to find the Fibonacci series using recursive and non recursive functions.
Week 2: Write a java program to multiply two given matrices.
Week 3: Write a java program for Method overloading and Constructor overloading.
Week 4: Write a java program to display the employee details using Scanner class.
Week 5: Write a java program that checks whether a given string is palindrome or not.
Week 6: Write a java program to represent Abstract class with example.
Week 7: Write a java program to implement Interface using extends keyword.
Week 8: Write a Java program that implements a multi-thread application that has three threads.
Week 9: Write an applet program that displays a simple message.
Week 10: Write a program for passing parameters using Applet.
Week 11: Write a java program for handling Mouse events and Key events.
Week 12: Write a java program that connects to a database using JDBC.

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3103
Course Name	Fundamental of Computer Algorithm
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   A course on the Fundamentals of Computer Algorithms typically covers foundational concepts and techniques used in the design and analysis of algorithms. Algorithms are essential in computer science for solving computational problems efficiently.

2. **Prerequisite:**

   To effectively engage with a course on the Fundamentals of Computer Algorithms, students should ideally have a solid foundation in several key areas of computer science and mathematics like Programming Skills, Data Structures, Discrete Mathematics and Basic Calculus and Algebra

3. **Objective of Syllabus:**

   The objectives of a course on the Fundamentals of Computer Algorithms are multifaceted, aiming to equip students with both theoretical understanding and practical skills necessary for effective algorithm design and analysis.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Demonstrate a thorough understanding of fundamental algorithms and data structures, including their properties, operations, and applications.
CO2	Analyze the time complexity, space complexity, and asymptotic behavior (Big-O notation) of algorithms.
CO3	Design efficient algorithms to solve a variety of computational problems, considering constraints and requirements.
CO4	Apply algorithmic problem-solving strategies to decompose complex problems into manageable components.
CO5	elect appropriate data structures to enhance algorithmic efficiency and effectiveness.

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CO6	Apply learned algorithms and techniques to solve real-world problems in diverse fields such as computer science, engineering, finance, and biology.

5. Syllabus.

UNIT -I

Introduction of Algorithm and their Complexity, Randomized Algorithm.

UNIT -II

Data Structure, Set Representation, Graphs, Trees, Recursion, Divide and Conquer, Balancing, Dynamic Programming.

UNIT -III

Depth First Search, Bi connectivity, Depth First Search of a Directed Graph and application, Breath First Search, Breath First Search of a Directed Graph and applications.

UNIT -IV

Introduction of Greedy Algorithm, Generate Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort and Other Applications.

Suggested Reading:

1. Introduction to Algorithm, 2e, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein,PHI.
2. Beginning Algorithms by Simen Harris, James Ross, Wiley India.
3. Fundamentals of Computer Algorithms by E. Horowitz and S. Sahni, Galgotia.
4. Algorithms by Richard Johansonbaugh and Marcus Schaefer, Pearson Algorithm.

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Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3104
Course Name	Fuzzy Logic
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

Fuzzy Logic is a specialized area of mathematics and computer science that deals with reasoning and decision-making in situations where the boundaries between true and false are blurred or uncertain.

2. Prerequisite:

Before diving into the study of Fuzzy Logic, it's beneficial to have a solid foundation in several key areas like Calculus, Linear Algebra, Probability and Statistics, Logic and Set Theory, Programming.

3. Objective of Syllabus:

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Students should be able to explain the concept of fuzzy sets and understand how fuzzy logic extends classical (Boolean) logic to handle uncertainty and vagueness.
CO2	Ability to define and work with fuzzy relations, and perform operations such as union, intersection, and complement of fuzzy sets.
CO3	Understanding the architecture and components of a fuzzy logic system, including fuzzification, fuzzy rules, inference, and defuzzification.
CO4	Awareness of real-world applications where fuzzy logic is used, such as in control systems, decision-making processes, pattern recognition, and artificial intelligence.
CO5	Techniques for evaluating and optimizing fuzzy logic systems, such as tuning membership functions, rule base refinement, and performance analysis.

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CO6	Awareness of ethical considerations and societal implications of using fuzzy logic in decision-making and automation.

5. Syllabus.

UNIT -I

Introduction to Fuzzy set, Relation between Fuzzy Set, Operations on Fuzzy Sets, Properties of the Standard Operations, Certain Numbers Associated with a Fuzzy Set.

UNIT -II

Certain Crisp Sets Associated with Fuzzy Set, Extension Principle, Fuzzy Set of Type-K and Level-K, Generation of Membership Functions.

UNIT -III

Fuzzy Relations, Operations on Fuzzy Relations, α-Cuts of a Fuzzy Relations, Composition of Fuzzy Relations, Cylindric Closure, Fuzzy Relation on a Domain.

UNIT -IV

Introduction, Three-valued Logics, N-valued Logics for N>=4, Infinite-valued Logic, Fuzzy Logics,Fuzzy Propositions and Their Interpretations in Terms of Fuzzy Sets, Fuzzy Rules and Their Interpretations in Terms of Fuzzy Relations, Fuzzy Inference or Approximate Reasoning, Generalizations of Fuzzy Logics.

Suggested Reading:

1. M. Ganesh- Introduction to Fuzzy Sets and Fuzzy Logic, PHI, 2004
2. Klir G.J. and Yuan B. - Fuzzy Sets and Fuzzy Logic, PHI, 2001.
3. Pedryes W. and Gomide F. - An Introduction to Fuzzy Sets: Analysis and Design, PHI.

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3105
Course Name	Management Information System
Course Credits	3 (L) = 3
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   A course on Management Information Systems (MIS) typically covers a range of topics aimed at understanding how information technology can be effectively used to support organizational functions and decision-making processes

2. **Prerequisite:**

   Students have a foundational understanding of relevant topics like Basic Computer Skills, Fundamentals of Information Technology, Introduction to Business or Management, Introduction to Data and Information, Communication Skills

3. **Objective of Syllabus:**

   The objectives of a Management Information System (MIS) revolve around leveraging technology to facilitate better decision-making and operational efficiency within an organization.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Students should demonstrate a solid understanding of the fundamental concepts, components, and types of information systems used in organizations.

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CO2	Capability to utilize information systems to support decision-making processes at various organizational levels (strategic, tactical, operational).
CO3	Proficiency in managing organizational data, including data collection, storage, retrieval, and analysis using appropriate tools and techniques.
CO4	Skills in analyzing business processes and identifying opportunities for improvement through the use of information systems.
CO5	Knowledge of information security principles and practices, including risk assessment, mitigation strategies, and compliance with regulatory requirements.
CO6	Ability to critically evaluate information systems issues and challenges, and propose effective solutions based on analytical reasoning and problem-solving skills.

5. Syllabus.

Unit –I

Introduction to MIS , The Technical and Business Perspective, Organization Structure, Evaluationof MIS through Information System, MIS Organization within the Company.

Unit –II

Information Systems for Decision Making: Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of BalancedMIS Effectiveness and Efficiency Criteria.

Unit –III

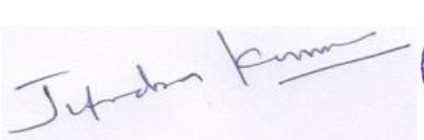
Development of MIS, Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS. Advanced MIS,Concepts, Needs and Problems in Achieving Advanced MIS, DSS.

Unit –IV

Fundamental Weakness, Soft Spots in Planning and Design Problems.

Suggested Reading:

1. Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.
2. Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.



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SEMESTER - VI

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3201
Course Name	Data Communication & Network
Course Credits	3 (L) + 1(T) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

Data Communication & Networks is a foundational course in computer science and information technology that explores the principles, technologies, and protocols that enable the exchange of data between devices over networks. The course covers both theoretical concepts and practical aspects essential for understanding how modern communication systems operate.

2. **Prerequisite:**

The prerequisites for a course in Data Communication & Networks typically include foundational knowledge and skills in several key areas like Basic Computer Literacy, Mathematics, Fundamentals of Computer Networks, Programming Skills.

3. **Objective of Syllabus:**

Overall, the objective of studying Data Communication & Networks is to equip students with the necessary knowledge and skills to design, manage, secure, and troubleshoot network infrastructures effectively. It prepares them for careers in various IT roles such as network administrators, network engineers, systems analysts, and cyber security professionals, where understanding data communication principles and network technologies is essential.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Explain the fundamental principles of data communication, including the OSI model and TCP/IP protocol suite.
CO2	Understand various data transmission techniques such as modulation, multiplexing, and error detection/correction.
CO3	Identify and explain the functions of networking devices (routers, switches, hubs) and their roles within network architectures.
CO4	Analyze the structure and operation of the Internet and its key components.

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CO5	Implement basic network security measures such as authentication, encryption, and firewalls.
CO6	Able to design and implement simple network architectures based on given requirements and apply subnetting techniques and IP addressing schemes effectively.

5. Syllabus.

UNIT –I

Data Transmission Basic Concepts and Terminology , Data Communication Model, Communication Tasks, Parallel & Serial Transmission, Transmission Models, Transmission Channel, Data Rate, Bandwidth Signal Encoding Schemes, Data Compression, Transmission Impairments, Layering and Design Issues, OSI Model, Services and Standards.

UNIT –II

Computer Network: Network Topology, Performance of Network, Network Classification Advantages & Disadvantages of Network, Transmission Media (guided and unguided), Network Architecture, OSI Reference Model, TCP/IP, SNA and DNA.

UNIT –III

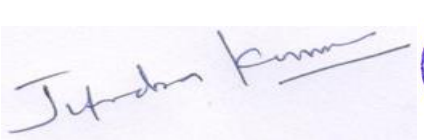
Physical Layer: Function and interface, physical layer standard, null modem. Local Area Network: Definition of LAN, LAN topologies, Layered architecture of MAC, IEEE standard. Ethernet LAN, CSMA, CSMA/ CD, Token passing LAN.

UNIT –IV

Data Line Devices, Modems, Techniques: (FDM, TDM). DSL, ADSL, Multiplexer and Different Multiplexing, Data Link Layer: Need for Data Link Control, Frame Design Consideration, Flow Control & Error Control (Flow control mechanism, Error Detection and Correction techniques) DataLink Layer Protocol, HDLC.

Suggested Reading:

1. Data Communication & Networking by Forouzan, Tata McGraw Hill.
2. Computer Network, 4e, by Andrew S. Tenenbaum, Pearson Education/ PHI.
3. Data Communication and Computer Networks, by Prakash C.Gupta, PHI.
4. Networking Ali-in-one Desk Reference by Doug Lowe, Wiley Dreamtech



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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3202
Course Name	Distributed Computing
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. **Course Overview:**

   Distributed Systems combine the computational power of multiple computers to solve complex problems. The individual computers in a distributed system are typically spread over wide geographies, and possess heterogeneous processor and operating system architectures. Hence, an important challenge in distributed systems is to design system models, algorithms and protocols that allow computers to communicate and coordinate their actions to solve a problem.

2. **Prerequisite:**

   To understand the basic computer organization, operating system structures, networks and related programming.

3. **Objective of Syllabus:**

   Our aim in this course is to introduce you to the area of distributed systems. You will examine and analyze how a set of connected computers can form a functional, usable and high performance distributed system.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	Able to Define and explain the concept of distributed computing and distributed systems.
CO2	Able to Describe different architectural models of distributed systems (e.g., client-server, peer-to-peer, distributed databases), Compare and contrast various architectural paradigms based on scalability, fault tolerance, and performance.
CO3	Able to design and implement sample distributed systems.

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CO4	Understand principles of concurrency and parallelism in distributed computing.
CO5	Able to Explain communication models and protocols used in distributed systems (e.g., RPC, RMI, REST).
CO6	Able to Analyze and implement fundamental distributed algorithms (e.g., leader election, consensus, mutual exclusion).

5. Syllabus.

UNIT –I

An Introduction of Distributed Computing: Definitions, The History of Distributed Computing, Different Forms of Computing, The Strengths and Weaknesses of Distributed Computing, Basics of Operating Systems, Network Basics, Software Engineering Basics.

UNIT –II

An Archetypal IPC Program Interface, Event Synchronization, Timeouts and Threading, Deadlocks and Timeouts, Data Representation, Data Encoding, Text-Based Protocols, Request-Response Protocols, Event Diagram and Sequence Diagram, Connection-Oriented versus Connectionless IPC.

UNIT –III

Distributed Computing Paradigms: Distributed Applications, Trade-offs. Paradigms and Abstraction, Paradigms for The Socket API: Background, The Socket Metaphor in IPC, The Datagram Socket API, The Stream- Mode Socket API, Sockets with Nonblocking I/O Operations, Secure Socket API.

UNIT –IV

The Client-Server Paradigm: Background, Client-Server Paradigm Issues, Software Engineering fora Network Service, Connection-Oriented and Connectionless Servers, Iterative Server and Concurrent Server, Stateful Servers.

Suggested Reading:

1. M.L.Liu- Distributed Computing: Principles and Applications, 1 st Indian Reprint, Pearson Education, 2004.
2. Distributed Computing by Liu. Pearson Education.
3. Distributed Computing by Hagit Attiya and Jennifer Welch, Wiley India.3.
4. Distributed Operating Systems : Concept and Design by P.K. Sinha, PHI
5. Distributed Operating System by Tenenbaum. Pearson Education

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Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3203
Course Name	Optimization Theory
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

Optimization Theory is a fundamental area of mathematics and applied science that deals with finding the best solution from a set of feasible alternatives. It encompasses a wide range of techniques and concepts used to optimize (minimize or maximize) functions, variables, or systems under specific constraints.

2. Prerequisite:

To effectively study Optimization Theory, it's essential to have a solid foundation in several key areas of mathematics and related disciplines.

3. Objective of Syllabus:

The primary objective of Optimization Theory is to develop mathematical frameworks, algorithms, and techniques to find the best possible solution from a set of feasible alternatives. This includes both maximizing or minimizing an objective function, subject to constraints, across various domains of application.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Able to Gain a thorough understanding of fundamental optimization principles, including objectives, constraints, feasible regions, and optimality conditions.
CO2	Able to Develop skills in translating real-world problems into mathematical optimization models.
CO3	Able to Learn a range of optimization algorithms and methods, such as gradient-based methods, Newton's method, simplex method, branch and bound, and heuristic approaches.
CO4	Understand to Develop analytical skills to evaluate and interpret optimization results, including sensitivity analysis and scenario analysis.
CO5	Understand Enhance critical thinking skills by analyzing trade-offs and making informed decisions based on optimization outcomes.

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CO6	Able to Develop effective communication skills to articulate optimization problems, methodologies, and results to both technical and non-technical audiences.

5. Syllabus.

UNIT –I

An Introduction of Optimization Theory, Definitions Characteristics of Operations Research Approach.

UNIT –II

Linear Programming- Applications and Model Formulation: Introduction, Structure of Linear Programming Model, Advantages of Using Linear Programming, Limitations of Linear Programming, Applications Areas of Linear Programming, General Mathematical Model of Linear Programming Model, Guidelines on Linear Programming Model Formulation, Examples of LP Model Formulation.

UNIT –III

Linear Programming- The Graphical Method: Introduction, Important Definitions, Graphical Solution Methods of LP Problem. Linear Programming- The Simplex Method: Introduction, StandardForm of an LP Problem, Simplex Algorithm (Maximization Case), Simplex Algorithm (MinimizationCase).

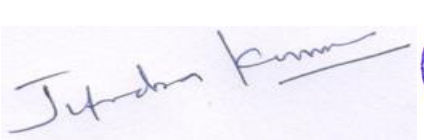
UNIT –IV

Duality in Linear Programming: Introduction, Formulation of Dual Linear Programming Problem, Standard Results on Duality, Managerial Significance of Duality, Advantages of Duality. Introduction, Types of Integer Programming Problems, Enumeration and Cutting Plane Solution

Concept, Gomory's All Integer Cutting Plane Method, Gomory's Mixed- Integer Cutting Plane Method, Branch and Bound Method, Applications of Zero-One Integer Programming.

Suggested Reading :

1. Operation Research, Kanti Swaroop
2. Operation Research,V.K. Kapoor
3. Operation Research,Paneer Selvam,PHI
4. Operations Research, Hillier & Lieberman, TMH
5. Operations Research, Kalavati,VIKAS
6. Operation Research,Humdy Taha,PHI
7. Statistics,Random Process & Queuing Theory, Prabha, Scitech
8. Operations Research, Vijayakumar, Scitech
9. Quantitative Techniques,Vol.1 & II ,L.C. Jhamb,EPH



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Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3204
Course Name	Accounting and Financial Management
Course Credits	3 (L) = 3
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

Accounting and Financial Management is a critical area of study that forms the backbone of business operations and decision-making. This course typically covers a wide range of topics aimed at equipping students with the knowledge and skills necessary to understand, analyze, and interpret financial information.

2. Prerequisite:

The prerequisites for a course in Accounting and Financial Management are Understanding basic accounting principles, financial statements. Basics of cost behavior, cost-volume-profit analysis, budgeting, and performance evaluation. Basic algebra, arithmetic, and mathematical reasoning skills. Introduction to financial management principles, time value of money, and financial decision-making within firms.

3. Objective of Syllabus:

The primary objective of Accounting and Financial Management is to equip individuals with the knowledge, skills, and understanding necessary to effectively manage financial resources and make informed decisions within an organization.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Ability to analyze and interpret financial statements (income statement, balance sheet, cash flow statement) to assess the financial health and performance of an organization.
CO2	Skills in calculating and interpreting financial ratios to evaluate profitability, liquidity, solvency, and efficiency.
CO3	Knowledge of cost behavior, cost-volume-profit analysis, and budgeting techniques for effective cost control and decision-making.
CO4	Understanding of variance analysis, standard costing, and performance evaluation methods to assess managerial performance.

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CO5	Ability to evaluate investment opportunities using techniques like Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period.
CO6	Understanding of risk and return trade-offs, diversification, and financial instruments (derivatives, options) to manage financial risk.

5. Syllabus.

UNIT –I

Basic of Accounting, Accounting Mechanics- Double Entry System, Classification, Rules for Debit and Credit Concepts & Conventions, Indian Accounting Standards.

UNIT –II

Journal: Meaning of Journal, Advantages, Subdivision. Ledger : Meaning, subdivision, Mechanics of Posting, balancing of Ledger accounts .Trial Balance: Objectives, Defects of trial balance, Errors disclosed by trial balance, preparation and locating errors.

UNIT –III

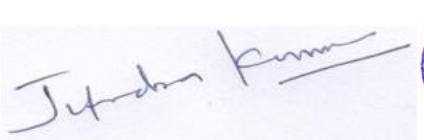
Cash Book and Subsidiary books of Accounting: Kinds of cashbook, Purchase daybook, Sales daybook, Bills receivable book, Bills payable book. Finance Accounts: Trading account,, Profit & Loss account, Adjustments, Balance Sheet, Forms of balance Sheet, Assets and their classification, liabilities and their classification, uses and limitations.

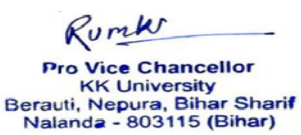
UNIT –IV

Capital & Revenue Expenditure & Receipts: Rules for determining capital expenditure, Deferred Revenue expenditure, Capital & Revenue receipts, Capital & Revenue Profits, Capital & Revenue Loss. Nature of Financial Management: Scope of financial functions, finance functions and job of finance manager, organization of finance function.

Suggested Reading:

1. Management Accounting – Manmohan Singh and Goel
2. Financial management- Pandey I. M.
3. Hanif & Mukherjee-Modern Accountancy, TMH, New Delhi.
4. Maheshwari & Maheshwari- An Introduction to Accountancy, Vikas Publishing House Pvt.Ltd., New Delhi.



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3205 A
Course Name	Intelligence System
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

The primary objective of this course is to introduce the basic principles Techniques, and applications of. Artificial Intelligence, students will get a basic knowledge about Searching techniques.

2. Prerequisite:

To understand the basic knowledge of Reasoning, Mathematics, Psychology and Learning Techniques.

3. Objective of Syllabus:

- The primary objective of this course is to introduce the basic principles
- techniques, and applications of. Artificial Intelligence
- In this course, students will get a basic introduction to the building blocks and components of artificial intelligence
- learning about concepts like algorithms.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	To understand Introduction to AI, Overview of AI, Problems of AI, AI technique, Searching techniques like hill climbing, A* Algorithm, AO*.
CO2	Apply AI algorithms to solve real-world problems.
CO3	Understand the principles of machine learning.
CO4	To understand Problem in representing knowledge, Knowledge representation propositional and predicate logic, resolution.

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CO5	Ability to understand Probabilistic reasoning, Baye's Theorem, Semantic networks logic, forward and backward reasoning.
CO6	Ability to understands Learning, various techniques in Learning, Introduction to Neural networks, application of Neural network, common sense and reasoning.

5. Syllabus.

UNIT -I

Scope of Artificial Intelligence, games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques in search and knowledge abstraction.

UNIT -II

Problem solving; state space search, search space control, heuristic search, hill climbing, branch and bound Knowledge representation; predicate logic, rule-based system, structured knowledge representation

UNIT -III

Semantic net Handling uncertainty, Fuzzy sets, probabilistic reasoning Learning, learning automation.

UNIT -IV

Learning by induction, Neural Networks, Genetic Algorithms Emerging technologies and devices.

Suggested Reading :

1. Artificial Intelligence, Rich & Knight, TMH
2. Introduction to AI & Expert Systems,Patterson,PHI
3. Neural Networks, Fuzzy Logic & Genetic Algorithms,Rajsekharan,PHI
4. Expert Systems, Giaranto, VIKAS

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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3205B
Course Name	Advance Network & Communication.
Course Credits	4 (L) = 4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This is a networking course that permits you to learn advanced networking topics such as data center networking, software-defined networking (SDN), and content delivery. Build an understanding of the fundamental concepts of computer networking. 2. Familiarize the student with the basic taxonomy and terminology of the computer networking area. 3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking. 4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

2. Prerequisite:

Basic knowledge of programming, Data Structures and Object Orient Programming

3. Objective of Syllabus:

The course will provide an insight of the various Network layer Models, working and architectural details of network layer, network security and practical insights via commonly used simulator. At the end of the curriculum the student will be well versed with the various network standards, data transmission, protocols at each layer, the concept of cryptography and firewals and also will be well equipped to work with NS2 simulator.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Build an understanding of the fundamental concepts of computer networking.
CO2	Familiarize the student with the basic taxonomy and terminology of the computer networking area.
CO3	Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking
CO4	Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

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CO5	To understand the protocol layering and physical level communication

5. Syllabus.

UNIT –I

Introduction to computer network- Topology; Base Band & Broad Band Topology; Guided & Unguided Media.Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM); Multiplexing (TDM, FDM, STDM). Encoding (RZ, NRZ, BIPLOAR, MANCHESTER, DIFF. MANCHESTER).

UNIT –II

Digital To Analog – ASK, PSK, FSK, QPSK. Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control, Error Detection methods. Goals of Layered protocols- Introduction to OSI, TCP/IP, IBM, SNA, ATM. Bit oriented (BSC) & Character oriented Protocol (SDLC, LAPB, LAPD, LLC) HDLC- frame format, station, states, configuration, access control.

UNIT –III

LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5) Introduction to WAN – DQDB (IEEE 802.6) & FDDI. Switching Technologies – Circuit, Message, and Packet. X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities (In brief Only). ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.

UNIT –IV

Introduction to leased lines, DSL, Digital Carriers. Bridging & Routing – Static & Dynamic (In Brief). IP, IP addressing, ICMP, ARP.RARP. Congestion Control, TCP, UDP. HTTP,FTP,Telnet,SMTP. Introduction to data security (private key, public key, ISO standards)

Suggested Reading:

1.Data Communication & Networking, Forouzan, TMH
2.Computer networks,Tannenbaum,PHI
3.Computer Communication Networks,Shanmugam & Rajeev, ISTE/EXCEL
4.Data & Computer Communication,Stallings,PHI
5. Data & Network Communication, Miller, VIKAS
6. Data Communication & Network, Dr. Prasad, Wiley Dreamtech
7.Computer Network Theory, Prasad, Scitech
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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3205C
Course Name	Image Processing
Course Credits	4 (L) =4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This will give the student knowledge of image processing Technique and its required features.

2. Prerequisite:

Should have knowledge of DATA compression technique**.**

3. Objective of Syllabus:

To gain knowledge about image its processing and its quality.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Will be able to know Elements of Image Processing – Sampling and Quantization – Relationships between pixels –Imaging Geometry
CO2	Will be able to know Image enhancement and restoration
CO3	Will be able to know Compression Standards - Image segmentation
CO4	Will be able to know Detection of Discontinuities – Boundary Detection – Edge linking
CO5	Will be able to know Image representation – Morphology – Interpretation

5. Syllabus.

UNIT -I

Digital image fundamentals - Introduction – Image Representation – Steps in Image Processing – Elements of Image Processing – Sampling and Quantization – Relationships between pixels – Imaging Geometry.

UNIT -II

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Image transforms - Fourier, Discrete Fourier, Fast Fourier, Walsh, Hadamard, Discrete Cosine and Haar Transforms - Image enhancement and restoration.

UNIT -III

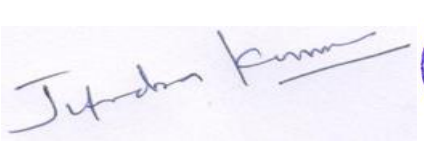
Domain methods – Point processing – Filtering – Color Image Processing – Degradation Model Circulant and Block Circulant matrices – Restoration – Inverse Filtering- Image compression and coding. Redundancy – Compression models – Coding Theorems – Different types of Coding – Lossy and Lossless compression - Compression Standards - Image segmentation.

UNIT -IV

Detection of Discontinuities – Boundary Detection – Edge linking – Thresholding – Segmentation –Image representation – Morphology – Interpretation.

Suggested Reading :

1. R. Gonzalez and R. E. Wood, Digital Image Processing, Prentice Hall of India, 1992.
2. K.Pratt, Digital Image Processing, McGraw Hill, 1981.



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School of Engineering & Technology.

Department of Computer Science & Engineering

Program Structure	BCA (Bachelor of Computer Application)
Subject Code	BCA3205D
Course Name	Advance Unix Programming
Course Credits	4 (L) =4
Total Course Credit	134

Abbreviations: T-Theory, P-Practical, L-Lecture

1. Course Overview:

This course will give the student knowledge about opersting system its uses and Management.

2. Prerequisite:

Should know how to use system

3. Objective of Syllabus:

Students will get to know hardware and software of system and will also get knowledge about its operation.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Will be able to know System, Administrative Tools, Starting and shutdown of system.
CO2	Will get knowledge about security .
CO3	Will get knowledge about LINUX and Data Management.
CO4	Will get knowledge about Pipes, Semaphores
CO5	Will get knowledge about Shared Memory, Sockets, Tool Command Language, PERL & CGI.

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5. Syllabus.

UNIT -I

Introduction to System, Administration Essential Administrative Tools, Starting and shutdown.

UNIT -II

User Accounts, Security, TCP / IP Network Management.

UNIT -III

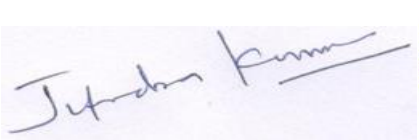
Getting started in LINUX, Linux Data Management, POSIX Threads.

UNIT -IV

Pipes, Semaphores, Message Queues, Shared Memory, Sockets, Tool Command Language, PERL & CGI.

Suggested Reading :

1. Linux Administration : A Beginner's Guide, Shah, TMH
2. LINUX: The Complete Reference, Petersen, TMH
3. Guide to LINUX installations & administration, Wealls,VIKAS
4. Red Hat LINUX-Administrator's Guide,Cox, PHI
5. LINUX Network Administrator's Guide, Kirch,SPD/O'REILLY
6. Essentials System Administration, Frisch,SPD/O'REILLY
7. Installing & administering LINUX, Linda, McKinnon, Wiley Dreamtech
8. CGI Programming with PERL,Gundavaram,SP



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