

Kalinga University

Information Technology

Bachelor Of Science (Computer Science)

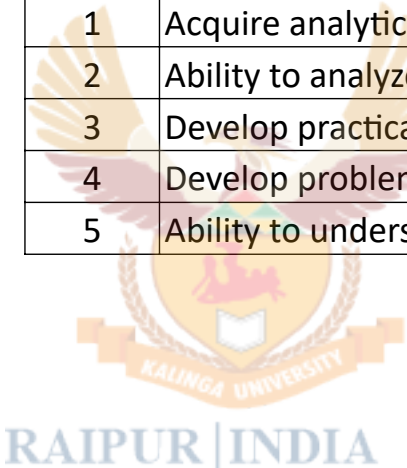
PO

S. No.	Program Outcome (PO) Description
1	Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
2	Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
3	Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies
4	Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions
5	Modern Tool Usage: Ability to select modern computing tools, skills and techniques necessary for innovative software solutions
6	Professional Ethics: Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
7	Life-long Learning: Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
8	Project Management: Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
9	Communication Efficacy: Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.
10	Societal & Environmental Concern: Ability to recognize economic, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.

11	Individual & Team Work: Ability to work as a member or leader in diverse teams in multidisciplinary environment.
12	Innovation and Entrepreneurship: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

PSO

S. No.	Program Specific Outcome (PSO) Description
1	Acquire analytical and problem solving skills in order to solve real world problems.
2	Ability to analyze the concepts and theories of Computer Science Mathematics and Physics
3	Develop practical skills to provide solutions to industry, society and business.
4	Develop problem solving skills and scientific reasoning
5	Ability to understand and Communicate technical concepts and designs to all kinds of audience



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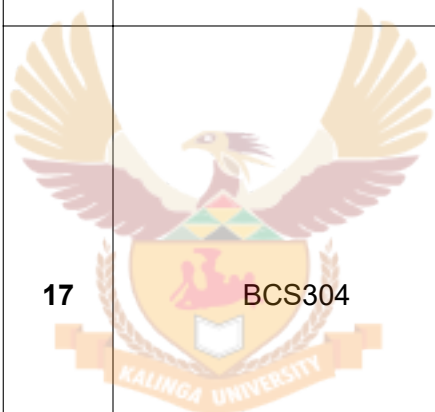
CO

S.No.	Course Code	Course Name	Course Outcome (CO's) - Description
1	BCS101	Programming for Problem Solving Using 'C/C++'	CO1: List and Demonstrate Basic Terminology Used in Computer Programming Write, Compile and Debug Programs in C and C++ Language.
			CO2: Understand and Apply Variable, Conditional Statements, Loops, Functions in C and C++.
			CO3: Practice Pointers, Structure, Union and Class in Programming.
			CO4: Explain and Differentiate the Process of Problem Solving Using Procedural and Object Oriented Programming Language.
			CO5: Understand and Practice Object Oriented Programming Concepts in C++
2	BCS102	Discrete Structures	CO1: Prove implication problems using truth table method, replacement process, analyzation method, truth table technique, rules of inference. Obtain PCNF and PDNF of given logical expression.
			CO2: Construct verbal arguments with predicates in symbolic form after validate them using inference.
			CO3: Represent the different types of relation in matrix, digraph and vice versa
			CO4: Find inverse and composition of functions.
			CO5: Prove the properties of lattices and Boolean algebra.
			CO6: Construct DFA and NDFA which accepts a given language.
			CO7: Modify the given grammar into language and vice-versa
3	BCS103	Fundamentals of Information Technology & Office Automation	CO1: Describe Computer System evolution, Characteristics and Types.
			CO2: Select Need base System Hardware and Software.
			CO3: Describe the OS, Types of OS, Batch File and features.
			CO4: Describe the Use, Process, Types and Topologies of Computer Communication.
			CO5: Outline Office Suit components with specific application List Open Office Software.
			CO6: Apply Word Processing Tools including Document Formatting, Using Graphics, Working with Macro and Mail Merge.
			CO7: Apply Spread Sheet Tools including Worksheet formatting, Using Functions, Graphics and Charts.
			CO8: Create effective Presentation Using Animation and Transition.
			CO1: Understand, identify and describe the services provided by operating systems.

4	BCS104	Operating Systems	CO2: Understand and solve problems involving process control, mutual exclusion, synchronization and deadlock.
			CO3: Implement processor scheduling, synchronization and disk allocation algorithms for a given scenario.
			CO4: Understand different types of operating system.
5	BCS105A	Environmental Studies	CO1: Understand and appreciate the multidisciplinary nature of environmental studies and recognize its connections with various fields of science and humanities
			CO2: Analyze the utilization of land resources and its impact on land-use change, land degradation, soil erosion, and desertification
			CO3: Define and distinguish between levels of biological diversity, including genetic, species, and ecosystem diversity
			CO4: Define and classify environmental pollution, including its types, causes, effects, and control measures
			CO5: Analyze the impacts of human population growth on the environment, human health, and welfare.
6	BCS201	Database Management System (DBMS)	CO1: Understand Data, Database system and its architecture.
			CO2: Apply ER modeling and Relational Database design using Normalization.
			CO3: Apply concepts of database storage and querying.
			CO4: Understand Concurrency, Recovery and Security mechanism in DBMS.
			CO5: Understand Current advances in DBMS.
7	BCS202	Data Structures	CO1: Understand the concept and usage of data types, dynamic memory management and data structures.
			CO2: Implement stack and queues algorithms
			CO3: Implement linked list data structures
			CO4: Implement graphs data structures
			CO5: Implement tree and sorting in data structures
			CO6: Choose the appropriate data structures to solve complex real life problems
8	BCS203	Computer Graphics	CO1: Understand the applications of computer graphics in various fields.
			CO2: Apply antialiasing and filtering techniques for improved graphics quality.
			CO3: Apply window-to-viewport transformations for coordinate mapping.
			CO4: Implement visible surface detection methods, including basic illumination, reflection, and shadow techniques.
			CO5: Utilize graphics library functions in animation design.

9	BCS204A	English	CO1: It will enhance Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, notetaking etc. While, to an extent, the art of communication is natural to all living beings, intoday's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions.
10	BCS205A	Information Security	CO1: Explain various security concepts and apply them in daily cyber use. CO2: Configure firewall and other security setting in computer CO3: Perform the malware and spam email identification, analysis, virus scanning and cleaning and other services using security tools CO4: Explain and practice the Cyber Law, Ethics, and Intellectual Property Rights, Patent and Trademark and Design Law
11	BCS205B	Network Programming	CO1: Understand the fundamentals of network programming concepts and protocols. CO2: Gain knowledge of different networking architectures and models. CO3: Develop skills in socket programming using various programming languages (e.g., Python, Java, C/C++). CO4: Learn how to design and implement client-server applications. CO5: Understand the concepts of multi-threading and concurrency in network programming.
12	BCS205C	Digital Electronics	CO1: Apply the principles of Number System, Binary Code and Boolean Algebra. CO2: Acquire Knowledge about Logic Gates. CO3: Design various Combinational and Sequential Circuits. CO4: Describe various Memory System and Shift Register CO5: Understand Processor Organization and Design of Simple Computer
13	BCS205D	Web Development with PHP	CO1: Develop programs using HTML and PHP CO2: Develop PHP Program using Character set, variables, data types, conditional and iterative statements, functions etc. CO3: Develop Web Pages using built-in functions related to string manipulation, mathematical, date and time etc. CO4: Develop Web pages using Arrays, Web forms, files, and databases with PHP
14	BCS201	Programming in Java	CO1: Explain the object oriented concepts and apply them for solving real problems. CO2: Demonstrate and apply the various features Java SDK to develop, run and debug java programs.

14	BCS301	Programming in Java	CO3: Apply java technology to develop the small applications, utilities, and web applications. CO4: Apply events management and layout managers using act, swing, jobs and servlet for developing the software for various problems
15	BCS302	Design and Analysis of Algorithm	CO1: To learn a strong foundation about algorithms. CO2: To learn different techniques for writing algorithm. CO3: To apply the techniques for producing algorithm for different problems.
16	BCS303	Computer Networks	CO1: Understand and explain Data Communications System and its components. CO2: Understand Computer Network basics and OSI and TCP/IP model. CO3: Understand Networks switching, error detection and error correction techniques. CO4: Identify the different types of network devices and their functions. CO5: Familiarity with the various protocols of computer networks.
17	BCS304	Operational Research	CO1: Students will be able to describe characteristics and scope of OR. CO2: Students will be able to define and formulate mathematical problems CO3: Students will be able to select optimal problems solving techniques for a given problem using LP. CO4: Students will be able to formulate and solve transportation, travelling sales man and transshipment problems CO5: Students will be able to formulate and solve optimization problems related to job/ work assignments. CO6: Students will be able to demonstrate and solve simple models of Game theory. CO7: Students will be able to evaluate optimum solution using dynamic programming for different applications CO8: Students will be able to choose / devise appropriate queuing model for practical application CO9: Students will be able to solve different problems related to Network
18	BCS305A	Computational Linguistics	CO1: Explain the approaches for syntax and semantics in NLP. CO2: Understand the concepts of morphology, syntax, semantics and pragmatics of the language CO3: Apply machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammars CO4: Analyze the current methods for statistical approaches to machine translation CO5: Compare and contrast the clustering and unsupervised methods, log-linear and discriminative models and the EM algorithm as applied within NLP.



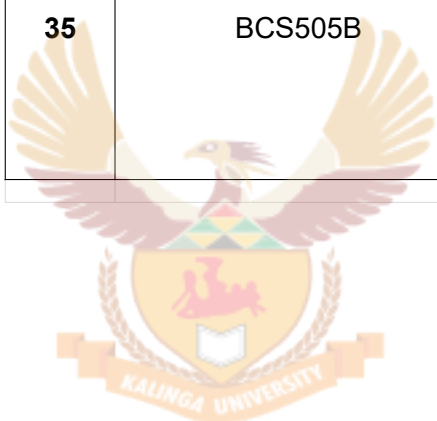
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			CO6: Identify the applications of NLP in real world scenario.
19	BCS305B	Digital Image Processing	CO1: Explain the fundamental concepts of a digital image processing System
			CO2: Apply techniques for enhancing digital images
			CO3: Examine the use of Fourier transforms for image processing in the frequency domain
			CO4: Compare various Image compression standards and morphological Operation
			CO5: Identify various Applications of Image Processing
20	BCS305C	Machine Learning	CO1: Gain knowledge about basic concepts of Machine Learning develop an appreciation for what is involved in learning from data.
			CO2: Develop learning algorithms based on logistic regression, Support Vector Machines to predict discrete-valued output given a training data comprising of features and corresponding class labels.
			CO3: Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms.
			CO4: Develop Linear Models for Regression using Bias-Variance Decomposition, Bayesian Linear Regression.
			CO5: Design Linear Models for Classification using Probabilistic Discriminative Models, The Laplace Approximation, Bayesian Logistic Regression.
21	BCS401	Computer System Architecture	CO6: Construct algorithms based on neural networks to perform simple learning tasks like speech recognition, digit recognition, optical character recognition and similar cognitive applications.
			CO1: Identify various components of computer and their interconnection
			CO2: Identify basic components and design of the CPU: the ALU and control unit.
			CO3: Compare and select various Memory devices as per requirement.
			CO4: Compare various types of I/O mapping techniques
22	BCS402	SOFTWARE ENGINEERING AND TESTING	CO5: Critique the performance issues of cache memory and virtual memory
			CO1: To classify the various Software Process Models
			CO2: To understand the Software Testing Concepts.
			CO3: To implement the Software Quality and Control Concepts
			CO4: To Design the Test cases and to get familiarity over Automated Testing tools
23	BCS403	Theory of Computation	CO1: Be familiar with Regular and Non regular Language and Finite automata.
			CO2: Examine the properties of formal language and automata, their equivalence and conversion techniques.
			CO3: Understand the concept of Context Free Grammars and Pushdown Automata.

			CO4: Be familiar with Turing machines.
24	BCS404	Universal Human Values	CO1: Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.
			CO2: Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
			CO3: Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.
			CO4: Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
			CO5: Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
25	BCS405A	Introduction to Data Science	CO1: Identify and execute basic tools of data science.
			CO2: Identify and execute basic syntax and programs in R.
			CO3: To understand data cleaning.
			CO4: To understand statistical techniques and visualize high-dimensional data.
			CO5: To understand the concept of Reproducible Research
26	BCS405B	Cloud Computing	CO1: Define Cloud Computing and memorize the different Cloud service and deployment models
			CO2: Describe importance of virtualization along with their technologies.
			CO3: Use and Examine different cloud computing services
			CO4: Analyze the components of Google Cloud platform
			CO5: Describe the key components of Amazon web Service.
			CO6: Design & develop backup strategies for cloud data based on features
27	BCS405C	Numerical Methods	CO1: Students can handle physical problems to find an approximated solution. After getting trained a student can opt for advance courses in Numerical analysis in higher mathematics. Use of good mathematical software will help in getting the accuracy one need from the computer and can assess the reliability of the numerical results, and determine the effect of round off error or loss of significance.
			CO1: Install and use Python on Various Platform.
			CO2: Understand and Explain various features of Python language

28	BCS501	Programming in Python	CO3: Desing and Developmect Python application for data anakysis using object oriented concept CO4: Build package and modules in Python with reusability and exception Aspect CO5: Write and execute Simple programs for sorting and searching in Python.
29	BCS502	Artificial Intelligence and Machine Learning	CO1: Interpret Artificial Intelligence concepts intelligence concepts CO2: Apply Artificial intelligence techniques for problem solving CO3: Analyze the fundamentals of machine learning, the learning algorithms and the paradigms of supervised and un-supervised learning CO4: Identify methods to improve machine learning results for better predictive performance
30	BCS503	Digital Marketing and Business Analytics	CO1: Understand the role of Digital Marketing Remembering CO2: Demonstrate use of various Digital Marketing Tools. CO3: Discuss key element of Digital Marketing Strategy. CO4: Understand use of Digital Marketing Tools for Digital Marketing Campaigns CO5: Assess / Measure the effectiveness of the Digital Marketing Campaigns. CO6: Demonstrate practical skills using common digital marketing tools like SEO, SEM, Content Marketing
31	BCS504A	Ethical Hacking	CO1: Recall the networking, sql, and encryption algorithm concepts to further study ethical hacking techniques, threats, tools and CO2: prevention against attacks CO3: Understand ethical hacking concepts, cases, ethics and cyberlaws CO4: Apply available hacking tools to find a solution to a given hacking issue. CO5: Analyze and classify the real-world hacking cases and situations
32	BCS504B	Green Computing	CO1: Acquire expertise for improving the energy efficiency for laptops and personal computers by reducing the power consumption requirements CO2: Assess enterprise-wide and personal computing and computing energy consumption CO3: Recognize the necessity for long-term sustainability in IT CO4: Formulate plans for reducing IT heating and cooling requirements CO5: Evaluate the regulatory and governance issues surrounding IT CO6: Choose the best sustainable hardware for their applications
33	BCS504C	DATA MINING AND WAREHOUSING	CO1: To know the basic concepts of data mining CO2: To classify & cluster the data CO3: To use association rules on data.

		WAREHOUSING	CO4: To introduce the concept of data warehousing CO5: To recover data in case of data loss
34	BCS505A	BIG DATA ANALYTICS	CO1: Identify the driving factors behind the emergence of Big Data and its impact on various industries. CO2: Learn about HBase concepts, advanced usage, and schema design. CO3: Teach programming with Resilient Distributed Datasets (RDDs) in Spark. CO4: Analyze the advantages of NoSQL databases and their use in various industries.
35	BCS505B	Soft Computing	CO1: Identify and describe soft computing techniques and their roles in building intelligent machines. CO2: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems. CO3: Apply genetic algorithms to combinatorial optimization problems. CO4: Evaluate and compare solutions by various soft computing approaches for a given problem CO5: Use various tools to solve soft computing problems



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