



Program Outcomes

Department: Computer Science and Engineering

List of Programme Outcomes (POs)

A Graduate of Computer Science and Engineering program will demonstrate

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 - Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 - The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 - Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

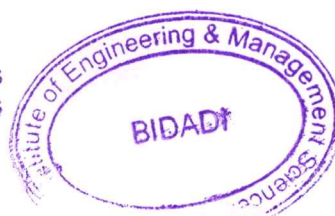
PO10 - Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 - Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 - Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.


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Program Outcomes
Department: Computer Science and Engineering

List of Programme Specific Outcomes (PSOs)

Graduate will be able to

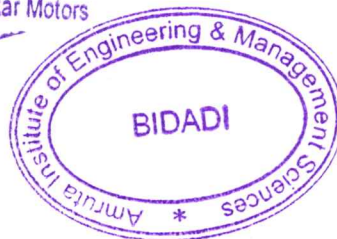
PSO-1 Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success

PSO-2 Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity

PSO-3 Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems

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COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME:2022

I Semester			
Course Name	Course Code	Course Outcomes	Statement
Mathematics-I for CSE Stream	BMATS101	CO1	Familiarize the importance of calculus associated with one variable and multivariable for computer science and engineering.
		CO2	Analyze Computer science and engineering problems by applying Ordinary Differential Equations.
		CO3	Apply the knowledge of modular arithmetic to computer algorithms
		CO4	Develop the knowledge of Linear Algebra to solve the system of equations
Applied Physics for CSE Stream	BPHYS102	CO1	To study the essentials of photonics and its application in computer science.
		CO2	To study the principles of quantum mechanics and its application in quantum computing.
		CO3	To study the electrical properties of materials
		CO4	To study the essentials of physics for computational aspects like design and data analysis.
Principles of Programming Using C	BPOPS103	CO1	Elucidate the basic architecture and functionalities of a computer
		CO2	Apply programming constructs of C language to solve the real-world problems



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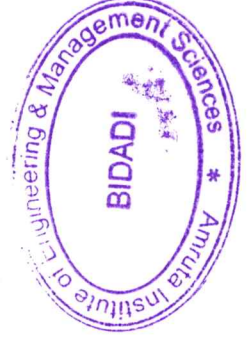
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Introduction to Electronics Communication	BESCK104C		CO3	Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems
			CO4	Design and Develop Solutions to problems using structured programming constructs such as functions and procedures.
			CO1	To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
			CO2	To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
Introduction to Embedded System	BETCK105J		CO3	Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.
			CO1	Introductory topics of Embedded System design
			CO2	Characteristics & attributes of Embedded System
			CO3	Introduction of Embedded System Software and Hardware development
			CO4	RTOS based Embedded system design



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COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME:2022

II Semester			
Course Name	Course Code	Course Outcomes	Statement
Mathematics II for CSE Stream	BMATS201	CO1	Familiarize the importance of Integral calculus and Vector calculus.
		CO2	Learn vector spaces and linear transformations
		CO3	Develop the knowledge of numerical methods and apply them to solve transcendental and differential equations
Applied Chemistry for CSE Stream	BCHE202	CO1	To enable students to acquire knowledge on principles of chemistry for engineering applications.
		CO2	To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
		CO3	To provide students with a solid foundation in analytical reasoning required to solve societal problems.
Computer Aided Engineering Drawing	BCEDK203	CO1	To understand the basic principles and conventions of engineering drawing
		CO2	To use drawing as a communication mode
		CO3	To generate pictorial views using CAD software
		CO4	To understand the development of Surfaces



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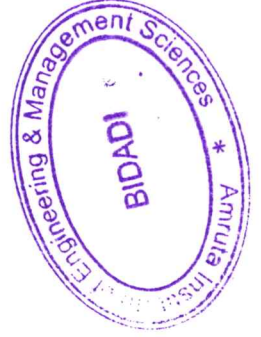
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Introduction to Civil Engineering	BESCK204A	CO5	To visualize engineering components
		CO1	To make students learn the scope of various specializations of civil engineering.
		CO2	To make students learn the concepts of sustainable infrastructure
		CO3	To develop students' ability to analyse the problems involving forces, moments with their applications.
		CO4	To develop the student's ability to find out the center of gravity and moment of inertia and their applications.
Introduction to Python Programming	BPLCK205B	CO5	To make the students learn about kinematics
		CO1	Learn the syntax and semantics of the Python programming language.
		CO2	Illustrate the process of structuring the data using lists, tuples
		CO3	Appraise the need for working with various documents like Excel, PDF, Word and Others
		CO4	Demonstrate the use of built-in functions to navigate the file system.
		CO5	Implement the Object-Oriented Programming concepts in Python.

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COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME:2021

III Semester			
Course Name	Course Code	Course Outcomes	Statement
TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	21MAT31	CO1	To solve ordinary differential equations using Laplace transform.
		CO2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
		CO3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
		CO4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
		CO5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
DATA STRUCTURES AND APPLICATIONS	21CS32	CO1	Identify different data structures and their applications.
		CO2	Apply stack and queues in solving problems.
		CO3	Demonstrate applications of linked list.
		CO4	Explore the applications of trees and graphs to model and solve the real-world problem.



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			CO5	Make use of Hashing techniques and resolve collisions during mapping of key value pairs
ANALOG AND DIGITAL ELECTRONICS	21CS33	CO1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.	
		CO2	Explain the basic principles of A/D and D/A conversion circuits and develop the same	
		CO3	Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods	
		CO4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.	
		CO5	Develop simple HDL programs	
COMPUTER ORGANIZATION AND ARCHITECTURE	21CS34	CO1	Explain the organization and architecture of computer systems with machine instructions and programs	
		CO2	Analyze the input/output devices communicating with computer system	
		CO3	Demonstrate the functions of different types of memory devices	
		CO4	Apply different data types on simple arithmetic and logical unit	
		CO5	Analyze the functions of basic processing unit, Parallel processing and pipelining	
OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY	21CSL35	CO1	Use Eclipse/NetBeans IDE to design, develop, debug Java Projects.	
		CO2	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP.	
		CO3	Demonstrate the ability to design and develop java programs, analyze, and interpret objectoriented data and document results.	
		CO4	Apply the concepts of multiprogramming, exception/event handling, abstraction to	



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			develop robust programs.
	CO5		Develop user friendly applications using File I/O and GUI concepts.
MASTERING OFFICE	CO1		Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet.
	CO2	21CSL381	Create, edit, save and print documents with list tables, header, footer, graphic, spellchecker, mail merge and grammar checker
	CO3		Attain the knowledge about spreadsheet with formula, macros spell checker etc.
	CO4		Demonstrate the ability to apply application software in an office environment.
	CO5		Use Google Suite for office data management tasks
PROGRAMMING IN C++	CO1	21CS382	Able to understand and design the solution to a problem using object-oriented programming concepts.
	CO2		Able to reuse the code with extensible Class types, User-defined operators and function Overloading
	CO3		Achieve code reusability and extensibility by means of Inheritance and Polymorphism
	CO4		Identify and explore the Performance analysis of I/O Streams.
	CO5		Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

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Dr. B. S. S.
HOD, CS&E
Amruta Institute of Engineering & Management Sciences
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COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME: 2021

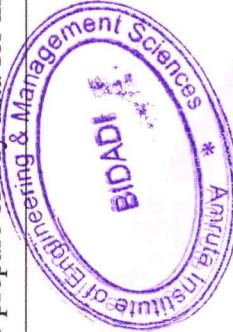
IV Semester			
Course Name	Course Code	Course Outcomes	Statement
DESIGN AND ANALYSIS OF ALGORITHMS	21CS42	CO1	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.
		CO2	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same
		CO3	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.
		CO4	Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.
		CO5	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NPComplete problems.
MICROCONTROLLER AND EMBEDDED	21CS43	CO1	Explain C-Compilers and optimization
		CO2	Describe the ARM microcontroller's architectural features and program



SYSTEMS			module.
		CO3	Apply the knowledge gained from programming on ARM to different applications
		CO4	Program the basic hardware components and their application selection method.
		CO5	Demonstrate the need for a real-time operating system for embedded system applications
		CO1	Identify the structure of an operating system and its scheduling mechanism.
		CO2	Demonstrate the allocation of resources for a process using scheduling algorithm.
		CO3	Identify root causes of deadlock and provide the solution for deadlock elimination
		CO4	Explore about the storage structures and learn about the Linux Operating system.
		CO5	Analyze Storage Structures and Implement Customized Case study
		CO1	Demonstrate proficiency in handling of loops and creation of functions.
		CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
		CO3	Discover the commonly used operations involving regular expressions and file system.
		CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
OPERATING SYSTEMS			
		21CS44	
PYTHON PROGRAMMING LABORATORY			
		21CSL46	



			Determine the need for scraping websites and working with PDF, JSON and other file formats.
WEB PROGRAMMING	21CSL481	CO1	Describe the fundamentals of web and concept of HTML
		CO2	Use the concepts of HTML, XHTML to construct the web pages.
		CO3	Interpret CSS for dynamic documents
		CO4	Evaluate different concepts of JavaScript & Construct dynamic documents
		CO5	Design a small project with JavaScript and XHTML.
UNIX SHELL PROGRAMMING	21CS482	CO1	Know the basics of Unix concepts and commands.
		CO2	Evaluate the UNIX file system.
		CO3	Apply Changes in file system.
		CO4	Understand scripts and programs.
		CO5	Analyze Facility with UNIX system process
R PROGRAMMING	21CSL483	CO1	To understand the fundamental syntax of R through readings, practice exercises,
		CO2	To demonstrations, and writing R code.
		CO3	To apply critical programming language concepts such as data types, iteration,
		CO4	To understand control structures, functions, and Boolean operators by writing R programs and through examples
		CO5	To import a variety of data formats into R using R-Studio
		C65	To prepare or tidy data for in preparation for analyze.





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COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME : 2018

V Semester			
Course Name	Course Code	Course Outcomes	Statement
MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY	18CS51	CO1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
		CO2	Utilize the resources available effectively through ERP
		CO3	Make use of IPRs and institutional support in entrepreneurship
Computer Networks and Security	18CS52	CO1	Explain principles of application layer protocols
		CO2	Recognize transport layer services and infer UDP and TCP protocols
		CO3	Classify routers, IP and Routing Algorithms in network layer
Database Management System	18CS53	CO4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
		CO5	Describe Multimedia Networking and Network Management
		CO1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.
	CO2	Use Structured Query Language (SQL) for database manipulation.	



			CO3	Design and build simple database systems
			CO4	Develop application to interact with databases.
			CO1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
			CO2	Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
Automata Theory and Computability	18CS54		CO3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers
			CO4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
			CO5	Classify a problem with respect to different models of Computation
			CO1	Demonstrate proficiency in handling of loops and creation of functions.
			CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
APPLICATION DEVELOPMENT USING PYTHON	18CS55		CO3	Discover the commonly used operations involving regular expressions and file system.
			CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5	Determine the need for scraping websites and working with CSV, JSON and other file formats.
			CO1	Explain Unix Architecture, File system and use of Basic Commands



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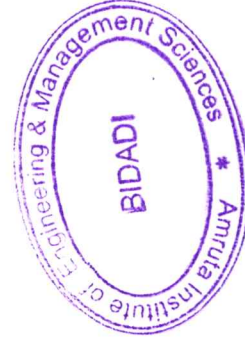
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PROGRAMMING		
	CO2	Illustrate Shell Programming and to write Shell Scripts
	CO3	Categorize, compare and make use of Unix System Calls
	CO4	Build an application/service over a Unix system.
COMPUTER NETWORK LABORATORY	CO1	Analyze and Compare various networking protocols.
	CO2	Demonstrate the working of different concepts of networking.
	CO3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and JAVA programming language
DBMS Laboratory with Mini Project	CO1	Use Structured Query Language (SQL) for database Creation and manipulation.
	CO2	Demonstrate the working of different concepts of DBMS
	CO3	Implement and test the project developed for an application.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME : 2018

VI Semester			
Course Name	Course Code	Course Outcomes	Statement
SYSTEM SOFTWARE AND COMPILERS	18CS61	CO1	Explain the System Software
		CO2	Design and Develop lexical analyzers, parser and code generator
		CO3	Utilize Lex and Yacc tools for implementing different concepts of system software
COMPUTER GRAPHICS AND VISUALIZATION	18CS62	CO1	Design and implement algorithms for 2D graphics primitives and attributes.
		CO2	Illustrate Geometric transformations on both 2D and 3D objects.
		CO3	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models
WEB TECHNOLOGY AND ITS APPLICATIONS	18CS63	CO4	Decide suitable hardware and software for developing graphics packages using OpenGL.
		CO1	Adapt HTML and CSS syntax and semantics to build web pages.
		CO2	Construct and visually format tables and forms using HTML and CSS.
		CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.



DATA MINING AND DATA WAREHOUSING	18CS641	CO4	Appraise the principles of object oriented development using PHP.
		CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.
		CO1	Identify data mining problems and implement the data warehouse
		CO2	Write association rules for a given data pattern.
		CO3	Choose between classification and clustering solution.
OBJECT ORIENTED MODELING AND DESIGN	18CS642	CO1	Describe the concepts of object-oriented and basic class modelling.
		CO2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
		CO3	Choose and apply a befitting design pattern for the given problem.
CLOUD COMPUTING AND ITS APPLICATIONS	18CS643	CO1	Explain cloud computing, virtualization and classify services of cloud computing
		CO2	Illustrate architecture and programming in cloud
		CO3	Describe the platforms for development of cloud applications and List the application of cloud.
ADVANCED JAVA AND J2EE	18CS644	CO1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
		CO2	Build client-server applications and TCP/IP socket programs.
		CO3	Illustrate database access and details for managing information using the JDBC API
		CO4	Describe how servlets fit into Java-based web application architecture



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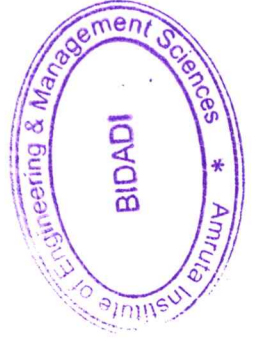
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		CO5	Develop reusable software components using Java Beans
SYSTEM MODELING AND SIMULATION	18CS645	CO1	Explain the system concept and apply functional modeling method to model the activities of a static system
		CO2	Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
		CO3	Simulate the operation of a dynamic system and make improvement according to the simulation results.
MOBILE APPLICATION DEVELOPMENT	18CS651	CO1	Create, test and debug Android application by setting up Android development environment
		CO2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
		CO3	Infer long running tasks and background work in Android applications
		CO4	Demonstrate methods in storing, sharing and retrieving data in Android applications
		CO5	Analyze performance of android applications and understand the role of permissions and security

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME : 2018

VII Semester			
Course Name	Course Code	Course Outcomes	Statement
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	18CS71	CO1	Appraise the theory of Artificial intelligence and Machine Learning.
		CO2	Illustrate the working of AI and ML Algorithms.
		CO3	Demonstrate the applications of AI and ML.
BIG DATA AND ANALYTICS	18CS72	CO1	Understand fundamentals of Big Data analytics.
		CO2	Investigate Hadoop framework and Hadoop Distributed File system.
		CO3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
SOFTWARE ARCHITECTURE	18CS731	CO4	Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
		CO5	Analyze web contents and Social Networks to provide analytics with relevant visualization tools.
		CO1	Design and implement codes with higher performance and lower complexity
CO2	Be aware of code qualities needed to keep code flexible		



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AND DESIGN PATTERNS		CO3	Experience core design principles and be able to assess the quality of a design with respect to these principles.	
			CO4	Capable of applying these principles in the design of object oriented systems.
			CO5	Be able to select and apply suitable patterns in specific contexts
HIGH PERFORMANCE COMPUTING	18CS732	CO1	Illustrate the key factors affecting performance of CSE applications	
		CO2	Illustrate mapping of applications to high-performance computing systems	
		CO3	Apply hardware/software co-design for achieving performance on real-world applications	
ADVANCED COMPUTER ARCHITECTURES	18CS733	CO1	Explain the concepts of parallel computing and hardware technologies	
		CO2	Compare and contrast the parallel architectures	
		CO3	Illustrate parallel programming concepts	
DIGITAL IMAGE PROCESSING	18CS741	CO1	Explain fundamentals of image processing	
		CO2	Compare transformation algorithms	
		CO3	Contrast enhancement, segmentation and compression techniques.	
NETWORK MANAGEMENT	8CS742	CO1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.	
		CO2	Apply network management standards to manage practical networks	
		CO3	Formulate possible approaches for managing OSI network model.	
		CO4	Use RMON for monitoring the behavior of the network	



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CRYPTOGRAPHY	18CS744	CO5	Identify the various components of network and formulate the scheme for the managing them
		CO1	Define cryptography and its principles
		CO2	Explain Cryptography algorithms
		CO3	Illustrate Public and Private key cryptography
		CO4	Explain Key management, distribution and certification
		CO5	Explain authentication protocols
		CO6	Tell about IPsec

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Bidadi Industrial Area, Near Toyota Kirloskar Motors
Off Mysore Road Bidadi Bangalore.



BVV Sangha, Bagalkot

AMRUTA INSTITUTE OF ENGINEERING & MANAGEMENT SCIENCES

Approved by AICTE, New Delhi

Recognized by Government of Karnataka & Affiliated to VTU, Belagavi

A I E M S
BENGALURU

COURSE OUTCOMES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME : 2018

VIII Semester			
Course Name	Course Code	Course Outcomes	Statement
INTERNET OF THINGS	18CS81	CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models
		CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		CO3	Appraise the role of IoT protocols for efficient network communication.
		CO4	Elaborate the need for Data Analytics and Security in IoT
		CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.
STORAGE AREA NETWORKS	18CS822	CO1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
		CO2	Explain components and the implementation of NAS
		CO3	Describe CAS architecture and types of archives and forms of virtualization
		CO4	Illustrate the storage infrastructure and management activities
PROJECT WORK	18CSP83	CO1	Present the project and be able to defend it.



PHASE-2			CO2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
			CO3	Habituated to critical thinking and use problem solving skills
			CO4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
			CO5	Work in a team to achieve common goal.
			CO6	Learn on their own, reflect on their learning and take appropriate actions to improve it.
			TECHNICAL SEMINAR	18CSS84
CO2	Identify, understand and discuss current, real-time issues.			
CO3	Improve oral and written communication skills.			
CO4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.			
CO5	Apply principles of ethics and respect in interaction with others.			
INTERNSHIP	18CSI85			
			CO2	Critical thinking, problem-solving, reasoning, analysis, interpretation, synthesizing information.
			CO3	Scientific literacy and reasoning, the scientific method.
			CO4	Research skills and practices, interrogative questioning.
			CO5	Creativity, curiosity, imagination, innovation, personal expression.

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