



Excellence in Higher Education

AKSHAYA

COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recognized by UGC and Affiliated to Anna University)

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DEPARTMENT OF COMPUTER SCIENCE AND BUSINESS SYSTEMS

COURSE OUTCOMES (REGULATION 2021)

SEMESTER III

Course Code /Course Name: MA3354 / Discrete Mathematics

CO No.	Course Outcomes (COs)
C201.1	Explain the concepts required to test the logic of a program and demonstrate their application.
C201.2	Apply counting principles to solve combinatorial problems and analyze their outcomes.
C201.3	Identify and analyze hierarchical structures to understand relationships across levels of abstraction.
C201.4	Analyze functions that transform finite sets and relate them to input-output functions in computing.
C201.5	Understand and evaluate the importance of lattices and Boolean algebra in problem-solving.

Course Code/Course Name: CS3351 / Digital Principles and Computer Organization

CO No.	Course Outcomes (COs)
C202.1	Design combinational digital circuits using logic gates and demonstrate their functionality.
C202.2	Construct sequential circuits and analyze their design and operation procedures.
C202.3	State the Fundamentals of computer systems and analyze the execution of an instruction.
C202.4	Analyze the different types of control design and identify hazards.
C202.5	Identify the characteristics of various memory systems and I/O communication.

Course Code/ Course Name: CW3301/Fundamentals of Economics

CO No.	Course Outcomes (COs)
C203.1	Analyze the effects of price, income, and substitution on consumer and producer surpluses and interpret their economic implications.
C203.2	Compare market equilibria under different competitive structures such as perfect competition, monopoly, and monopolistic competition.
C203.3	Explain the demand and supply of money using appropriate models in macroeconomic analysis to assess their impact on the economy.
C203.4	Examine the causes and effects of voluntary and involuntary unemployment, and evaluate policies to address these issues.
C203.5	Apply economic concepts and models to solve real-world problems related to market structures and macroeconomic conditions.

Course Code/ Course Name: CS3391 / Object Oriented Programming

CO No.	Course Outcomes (COs)
C204.1	Apply the concepts of classes and objects to develop solutions for simple problems.
C204.2	Develop programs using inheritance, packages, and interfaces to demonstrate modular design.
C204.3	Utilize exception handling and multithreading techniques to solve real-world problems efficiently.
C204.4	Build Java applications by integrating I/O packages, string classes, collections, and generics.
C204.5	Design GUI-based applications using event handling, JavaFX components, and controls.

Course Code/Course Name: AD3351 / Design and Analysis of Algorithms

CO No.	Course Outcomes (COs)
C205.1	Analyze the efficiency of recursive and non-recursive algorithms mathematically
C205.2	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques
C205.3	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques.
C205.4	Solve the problems using iterative improvement techniques for optimization.
C205.5	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques

Course Code/ Course Name: AD3491 / Fundamentals of Data Science and Analytics

CO No.	Course Outcomes (COs)
C206.1	Explain the data analytics pipeline, including data collection, processing, and deployment.
C206.2	Describe and visualize data using graphs, plots, and dashboards for better insights.
C206.3	Perform statistical inferences by analyzing data trends and testing hypotheses.
C206.4	Analyze variance in datasets using statistical methods like ANOVA.
C206.5	Build predictive models using machine learning techniques and validate their accuracy.

Course Code/ Course Name: CW3311/Business Communication Laboratory I

CO No.	Course Outcomes (COs)
C207.1	Speak fluently in English without errors and present themselves as effective communicators.
C207.2	Use business vocabulary and take part comfortably in business conversations in English.
C207.3	Draft letters and reports with appropriate formats and choice of words
C207.4	Perform well in team and group, resolve conflicts in workplaces and acquire leadership skills.
C207.5	Understand women in all spheres and cultural behaviors of the people and approach them with positive human values.

Course Code /Course Name: CS3381 / Object Oriented Programming Laboratory

CO No.	Course Outcomes (COs)
C208.1	Design and develop Java programs by applying object-oriented programming concepts.
C208.2	Develop simple applications using object-oriented principles such as packages and exception handling.
C208.3	Create GUIs and implement event-driven programming to address real-world problems.
C208.4	Apply multithreading and generics concepts to build efficient applications.
C208.5	Develop and deploy web applications using Java technologies.

Course Code/Course Name: GE3361 / Professional Development

CO No.	Course Outcomes (COs)
C209.1	Create professional technical documents using MS Word, apply templates, styles, and formatting to enhance clarity and presentation.
C209.2	Utilize MS Excel to perform data manipulation, analysis, and visualization, including statistical and logical operations.
C209.3	Design and deliver effective presentations using MS PowerPoint by organizing content and incorporating media elements.
C209.4	Apply advanced office tools to optimize workflow efficiency in technical and business environments.
C209.5	Integrate skills in document creation, data handling, and presentation to enhance professional communication.

SEMESTER IV

Course Code / Course Name: MA3391 / Probability and Statistics

CO No.	Course Outcomes (COs)
C210.1	Apply the concepts of random variables and solve practical problems using standard distributions.
C210.2	Calculate the correlation and regression for two variables and apply in engineering applications.
C210.3	Obtain estimators using estimation methods such as Maximum likelihood, Minimum chi square, and method of moments.
C210.4	Apply various one sample tests NPT such as test of randomness, Sign test, Kolmogorov Smirnov (KS) test.
C210.5	Determine the Tolerance intervals. Construct group control chart, draw charts for variables and attributes.

Course Code / Course Name: CS3492 / Database Management Systems

CO No.	Course Outcomes (COs)
C211.1	Understand relational database model with database system architecture and construct SQL Queries using relational algebra.
C211.2	Create a database design using Entity Relationship model and decompose the database using normalization.
C211.3	Construct queries to handle transaction processing and maintain consistency of the database using concurrency control
C211.4	Compare and contrast various indexing strategies and apply query optimization techniques to tune the performance of the database.
C211.5	Appraise how advanced distributed databases differ from Relational Databases and construct different No SQL databases with enhanced security.

Course Code/ Course Name: AL3452 /Operating Systems

CO No.	Course Outcomes (COs)
C212.1	Explain the system architecture and the services provided by operating systems which serve as a stepping stone for more advanced topics in computer science, such as distributed systems, cloud computing, and cyber security.
C212.2	Design, implement, and optimize processes within a computer system and develop systems that are responsive, efficient, reliable, efficient, scalable and capable of handling concurrent tasks.
C212.3	Analyze which memory management method is applicable in managing memory resources effectively, optimizing system performance, and understanding the intricacies of memory-related issues in both single-user and multi-user environments.
C212.4	Compare various scheduling methods in managing storage resources effectively, optimizing data access and retrieval, and understanding the storage-related technologies and strategies
C212.5	Explain virtualization technologies and understand the intricacies of mobile platforms, enabling them to pursue careers in areas such as virtualization administration, mobile app development, and mobile device management.

Course Code/ Course Name: CW3401/Introduction to Business Systems

CO No.	Course Outcomes (COs)
C213.1	Analyze and evaluate internal and external factors influencing business operations and organize resources efficiently to achieve business objectives.
C213.2	Determine the cross-cultural communication and leadership skills necessary for managing diverse teams in a global environment and analyze the advantages and disadvantages of hierarchical, matrix, and network organizational structures.
C213.3	Evaluate the interrelationships between different business functions and their impact on overall business performance.
C213.4	Identify the integration of performance measurement and control processes in business management.
C213.5	Explain various business software applications integrate to support comprehensive business solutions.

Course Code /Course Name: AL3451/ Machine Learning

CO No.	Course Outcomes (COs)
C214.1	Apply suitable algorithms for selecting the appropriate features for analysis.
C214.2	Implement supervised machine learning algorithms on standard datasets and evaluates the performance.
C214.3	Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance.
C214.4	Demonstrate multilayer perceptron including activation factors, and excel in optimizing network performance through hyper parameter tuning techniques.
C214.5	Evaluate machine learning experiments, employing Cross Validation and resampling methods to ensure robustness and reliability in model evaluation and performance estimation.

Course Code/Course Name: GE3451 / Environmental Sciences and Sustainability

CO No.	Course Outcomes (COs)
C215.1	Explain the concept of environment and biodiversity, and apply conservation strategies for environmental protection.
C215.2	Identify the causes and effects of environmental pollution and propose control measures and disaster management strategies.
C215.3	Understand energy management and conservation, and evaluate the potential of renewable energy sources.
C215.4	Analyze sustainability practices and assess the impacts of climate change, carbon credits, and environmental management challenges.
C215.5	Examine the role of sustainable urbanization and apply principles of green materials and energy cycles in sustainability practices.

Course Code /Course Name: CS3481/ Database Management Systems Laboratory

CO No.	Course Outcomes (COs)
C216.1	Write SQL queries using typical data definition language and data manipulation language with different types of Key constraints in relational database management system
C216.2	Construct SQL queries using and using where clause perform different join operations and apply Data Control Language for complex transactions.
C216.3	Apply advanced features of PL/SQL such as stored procedures and triggers, incorporate in GUI based application development.
C216.4	Apply view, index for an SQL database and create a web application to retrieve data from XML database with XML Schema validation.
C216.5	Create and manipulate NoSQL database to perform CRUD operations, apply the database design for a real time application.

Course Code/ Course Name: AD3461 / Machine Learning Laboratory

CO No.	Course Outcomes (COs)
C217.1	Apply suitable feature selection algorithms and evaluate their effectiveness for analysis.
C217.2	Implement supervised machine learning algorithms on standard datasets and analyze their performance.
C217.3	Apply unsupervised machine learning techniques to datasets and evaluate their performance outcomes.
C217.4	Build graph-based learning models for datasets and demonstrate their application in machine learning.
C217.5	Assess and compare the performance of different ML algorithms and select the suitable one based on the application.

Course Code/ Course Name: CW3311/Business Communication Laboratory II

CO No.	Course Outcomes (COs)
C218.1	Speak fluently in English with correct sentence construction and demonstrate effective communication skills.
C218.2	Differentiate between the use of adjectives and verbs and apply them accurately in context.
C218.3	Deliver public speeches tailored to the audience's needs and demonstrate positive body language.
C218.4	Analyze team dynamics, including motivation, multicultural collaboration, and conflict resolution strategies.
C218.5	Understand the ethical responsibilities and social media presence needed to develop leadership skills in the workplace.

SEMESTER V

Course Code/Course Name: CS3691 / Embedded Systems and IoT

CO No.	Course Outcomes (COs)
C301.1	Explain the architecture of embedded processors and evaluate their applications in embedded systems.
C301.2	Write efficient embedded C programs and demonstrate their functionality in real-world applications.
C301.3	Design simple embedded applications and implement them using appropriate hardware and software.
C301.4	Compare different communication models in IoT and analyze their suitability for specific applications.
C301.5	Design IoT applications using platforms like Arduino, Raspberry Pi, and open-source tools, and evaluate their performance.

Course Code/Course Name: CW3501 /Fundamentals of Management

CO No.	Course Outcomes (COs)
C302.1	Understand the key elements of effective management and apply them in organizational contexts.
C302.2	Apply planning and decision-making concepts to organizational problems and evaluate outcomes.
C302.3	Describe organizational concepts and analyze the staffing process and its importance.
C302.4	Adopt directing strategies through motivation and leadership to influence team

	performance.
C302.5	Demonstrate the use of control methods to manage changes in the business environment effectively.

Course Code/Course Name: CW3551/Data and Information Security

CO No.	Course Outcomes (COs)
C303.1	Explain the fundamentals of data and information security and apply security principles to protect information.
C303.2	Illustrate the legal, ethical, and professional issues in information security and evaluate their impact on organizations.
C303.3	Identify various authentication schemes and apply them to simulate different security applications.
C303.4	Examine security practices and analyze system security standards to ensure data protection.
C303.5	Design e-commerce applications using web security protocols to ensure secure online transactions.

Course Code/Course Name: CCS335/Cloud Computing (Professional Elective I)

CO No.	Course Outcomes (COs)
C304.1	Define the design challenges in cloud computing and explain their impact on system architecture.
C304.2	Apply the concept of virtualization and analyze its different types for cloud deployment.
C304.3	Experiment with the virtualization of hardware resources and use Docker for containerization.
C304.4	Develop and deploy services on the cloud and set up a cloud computing environment.
C304.5	Explain the security challenges in the cloud environment and propose solutions to mitigate risks.

Course Code/Course Name: CCS336/Cloud Services Management (Professional Elective II)

CO No.	Course Outcomes (COs)
C305.1	Demonstrate cloud design skills to build and automate business solutions using cloud technologies and apply them in real-world scenarios.
C305.2	Develop a strong theoretical foundation in cloud computing and apply knowledge to drive cloud service adoption.
C305.3	Solve real-world problems by leveraging cloud services and technologies to enhance business operations.
C305.4	Evaluate cloud-based solutions for scalability and apply best practices in service management.
C305.5	Analyze cloud service models and implement effective cloud strategies to optimize business performance.

Course Code/Course Name: AD3512 / Summer internship

CO No.	Course Outcomes (COs)
C306.1	Understand industry practices, processes, and technologies in software development, and apply automation techniques.
C306.2	Analyze complex business problems and design effective solutions using appropriate methodologies.
C306.3	Develop and deploy solutions on the target platform, ensuring functionality and scalability.

C306.4	Prepare technical reports and deliver presentations to communicate project outcomes effectively.
C306.5	Evaluate the impact of implemented solutions and reflect on their alignment with industry standards.

SEMESTER VI

Course Code/Course Name: CW3601/Business Analytics

CO No.	Course Outcomes (COs)
C307.1	Explain real-world business problems and model analytical solutions to address them.
C307.2	Identify key business processes and extract business intelligence for decision-making.
C307.3	Apply predictive analytics techniques for business forecasting and evaluate outcomes.
C307.4	Analyze supply chain and logistics data using analytics to optimize management strategies.
C307.5	Make Use of analytics tools to improve marketing and sales strategies for business growth.

Course Code/ Course Name: CCS356/Object Oriented Software Engineering

CO No.	Course Outcomes (COs)
C308.1	Compare various software development lifecycle models and analyze their suitability for different projects.
C308.2	Evaluate project management approaches and apply cost and schedule estimation strategies to project planning.
C308.3	Perform formal analysis on software specifications and apply logical methods for validation.
C308.4	Make Use of UML diagrams for system analysis and design to model object-oriented systems effectively.
C308.5	Design software architectures using architectural styles and design patterns and test the system for functionality and performance.

Course Code/Course Name: OCE351/Environmental and Social Impact Assessment
(Open Elective–I*)

CO No.	Course Outcomes (COs)
C309.1	Conduct scoping and screening for developmental projects to assess environmental and social impacts.
C309.2	Explain different methodologies for predicting and assessing environmental impacts on development projects.
C309.3	Plan and implement environmental impact assessments and design comprehensive environmental management plans.
C309.4	Evaluate environmental impact assessment reports and recommend improvements for sustainability.
C309.5	Analyze the environmental and social risks of projects and develop strategies to mitigate negative impacts.

Course Code/Course Name: CCS345/ Ethics and AI (Professional Elective III)

CO No.	Course Outcomes (COs)
C310.1	Understand the principles of morality and ethics in AI and apply ethical considerations in AI development.
C310.2	Acquire knowledge about real-time application ethics, identify challenges, and analyze ethical issues in AI applications.
C310.3	Evaluate the ethical harms in AI and develop ethical initiatives to address these concerns.
C310.4	Learn AI standards and regulations, including AI agent responsibilities and apply safe design principles for autonomous systems.
C310.5	Examine societal issues in AI and assess national and international strategies for responsible AI integration.

Course Code/Course Name: CCS360 / Recommender Systems (Professional Elective IV)

CO No.	Course Outcomes (COs)
C311.1	Understand the basic concepts of recommender systems and explain their importance in modern applications.
C311.2	Implement machine learning and data mining algorithms in recommender system datasets to enhance prediction accuracy.
C311.3	Apply collaborative filtering techniques and evaluate the performance of recommender systems using various metrics.
C311.4	Design and implement a real-world recommender system to address user needs and preferences effectively.
C311.5	Explore advanced topics in recommender systems, including advanced algorithms and techniques for system improvement.
C311.6	Investigate the applications of advanced recommender systems in various domains and analyze their impact.

Course Code/ Course Name: CCS354 / Network Security (Professional Elective V)

CO No.	Course Outcomes (COs)
C312.1	Classify various encryption techniques and understand their applications in data security.
C312.2	Illustrate key management and authentication techniques for secure communication.
C312.3	Evaluate security measures applied to network and transport layers to ensure data integrity and privacy.
C312.4	Discuss application layer security standards and their implementation in protecting applications.
C312.5	Apply security practices in real-time applications to protect data and network infrastructure.

Course Code/Course Name: CCS359 / Quantum Computing (Professional Elective VI)

CO No.	Course Outcomes (COs)
C313.1	Understand the fundamentals of quantum computing and explain its significance in modern technology.
C313.2	Comprehend the background of quantum mechanics and examine its application to quantum computing.
C313.3	Analyze various computational models and evaluate their relevance in quantum systems.
C313.4	Model quantum circuits using appropriate environments and frameworks to implement quantum computations.
C313.5	Understand quantum operations such as noise and error correction, and apply them to enhance quantum computing reliability.