Department of Information Technology
K. K. Wagh Institute of Engineering Education and Research
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Vision:

Excellence in Technical Education to nurture competent IT professionals

Mission:

- To provide comprehensive education through structured and dynamic learning systems to the students in the ever growing and technically challenging world of information and computing.
- To foster creativity, productivity, innovation, integrity and social awareness among the students for the development of novel IT solutions for contributing aptly to society and life at large.

Programme Educational Objectives (PEO's):

PEO1: Graduates of the program will possess strong fundamental concepts in mathematics, science, engineering and technology to address technological challenges.

PEO2: Possess knowledge and skills in the field of Computer Science & Engineering and Information technology for analyzing, designing and implementing complex engineering problems of any domain with innovative approaches.

PEO3: Possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Computer Science & Engineering and Information Technology.

PEO4: Have commitment to ethical practices, societal contributions through communities and lifelong learning.

PEO5: Possess better communication, presentation, time management and team work skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

Program Outcomes:

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

PO2: Problem analysis: Identify, formulate, research literature, and analyse 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 public health and safety, and cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis & interpretation of dataand 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 modelling 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 an d 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 member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with t h e 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 understandingof 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 technological change.

Subject 1: **Discrete Mathematics (214441)**

At the end of this course, Students will be able to

CO214441.1. Formulate and apply formal proof techniques and solve the problems with logical reasoning.

CO214441.2. Analyze and evaluate the combinatorial problems by using probability theory.

CO214441.3. Apply the concepts of graph theory to devise mathematical models.

CO214441.4. Analyze types of relations and functions to provide solution to computational problems.

CO214441.5. Identify techniques of number theory and its application.

CO214441.6. Identify fundamental algebraic structures.

Subject 2: Logic Design & Computer Organization **(214442)**

At the end of this course, Students will be able to

CO214442.1 Perform basic binary arithmetic & simplify logic expressions.

CO214442.2 Grasp the operations of logic ICs and Implement combinational logic functions using ICs.

CO214442.3 Comprehend the operations of basic memory cell types and Implement sequential logic functions using ICs.

CO214442.4 Elucidate the functions & organization of various blocks of CPU.

CO214442.5 Understand CPU instruction characteristics, enhancement features of CPU.

CO214442.6 Describe an assortment of memory types (with their characteristics) used in computer Systems and basic principle of interfacing input, output devices.

Subject 3: Data Structure & Algorithms (214443)

At the end of this course, Students will be able to

CO214443.1 Perform basic analysis of algorithms with respect to time and space complexity.

CO214443.2 Select appropriate searching and/or sorting techniques in the application development.

CO214443.3 Implement abstract data type (ADT) and data structures for given application. **CO214443.4** Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.

CO214443.5 Apply implement learned algorithm design techniques and data structures to solve Problems.

CO214443.6 Design different hashing functions and use files organizations.

Subject 4: Object-Oriented Programming Programming (214444)

At the end of this course, Students will be able to

CO214444.1. Differentiate various programming paradigms.

CO214444.2. Identify classes, objects, methods, and handle object creation, initialization, and Destruction to model real-world problems.

CO214444.3. Identify relationship among objects using inheritance and polymorphism principles.

CO214444.4. Handle different types of exceptions and perform generic programming.

CO214444.5. Use of files for persistent data storage for real world application.

CO214444.6. Apply appropriate design patterns to provide object-oriented solutions.

Subject 5: **Basics of Computer Network (214445)**

At the end of this course, Students will be able to

CO214445.1 Understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model.

CO214445.2 Analyze data link layer services, error detection and correction, linear block codes, cyclic Codes, framing and flow control protocols.
CO214445.3 Compare different access techniques, channelization and IEEE standards.
CO214445.4 Apply the skills of subnetting, supernetting and routing mechanisms.
CO214445.5 Differentiate IPv4 and IPv6.
CO214445.6 Illustrate services and protocols used at transport layer.

SE – Sem II

Subject 1: Engineering Mathematics – III (207003)
At the end of this course, Students will be able to
CO207003.1 Solve Linear differential equations, essential in modelling and design of computer-based systems.
CO207003.2. Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
CO207003.3. Apply Statistical methods like correlation& regression analysis and probability theory for Data analysis and predictions in machine learning.
CO207003.4 Solve Algebraic &Transcendental equations and System of linear equations using numerical techniques.
CO207003.5 Obtain Interpolating polynomials, numerical differentiation and integration, numerical Solutions of ordinary differential equations used in modern scientific computing.

Subject 2: Processor Architecture (214451)
At the end of this course, Students will be able to
CO214451.1 Apprehend architecture and memory organization of PIC 18 microcontroller.
CO214451.2 Implement embedded C programming for PIC 18.
CO214451.3 Use concepts of timers and interrupts of PIC 18.
CO214451.4 Demonstrate real life applications using PIC 18.
CO214451.5 Analyze architectural details of ARM processor.

Subject 3: Database Management System (214452)
At the end of this course, Students will be able to
CO214452.1 Apply fundamental elements of database management systems.
CO214452.2 Design ER-models to represent simple database application scenarios.
CO214452.3 Formulate SQL queries on data for relational databases.
CO214452. 4 Improve the database designs by normalization & to incorporate query processing.
CO214452.5 Apply ACID properties for transaction management and concurrency control.
CO214452.6 Analyze various database architectures and technologies.

Subject 4: Computer Graphics (214453)
At the end of this course, Students will be able to
CO214453.1 Apply mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines, circle, and apply it for problem solving.
CO214453.2 Employ techniques of geometrical transforms to produce, position and manipulate Objects in 2 dimensional and 3-dimensional space respectively.
CO214453.3 Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device.

CO214453.4 Apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications.
CO214453.5 Perceive the concepts of virtual reality.

Subject 5: Software Engineering (214456)
At the end of this course, Students will be able to
CO214456.1 Classify various software application domains.
CO214456.2 Analyze software requirements by using various modeling techniques.
CO214456.3 Translate the requirement models into design models.
CO214456.4 Develop Apply planning and estimation to any project.
CO214456.5 Use quality attributes and testing principles in software development life cycle.
CO214456.6 Discuss recent trends in Software engineering by using CASE and agile tools.

TE – Sem I

Subject 1: Theory of Computation(314441)
At the end of this course, Students will be able to
CO314441.1 Construct finite automata and its variants to solve computing problems.
CO314441.2 Write regular expressions for the regular languages and finite automata.
CO314441.3 Identify types of grammar, design and simplify Context Free Grammar.
CO314441.4 Construct Pushdown Automata machine for the Context Free Language.
CO314441.5 Design and analyze Turing machines for formal languages.
CO314441.6 Understand decidable and undecidable problems, analyze complexity classes.

Subject 2: Operating Systems (314442)
At the end of this course, Students will be able to
CO314442.1 Explain the role of Modern Operating Systems.
CO314442.2 Apply the concepts of process and thread scheduling.
CO314442. 3 Illustrate the concept of process synchronization, mutual exclusion and the deadlock.
CO314442.4 Implement the concepts of various memory management techniques.
CO314442.5 Make use of concept of I/O management and File system.
CO314442.6 Understand Importance of System software.

Subject 3: Machine Learning (314443)
At the end of this course, Students will be able to
CO314443.1 Apply basic concepts of machine learning and different types of machine learning algorithms.
CO314443.2 Differentiate various regression techniques and evaluate their performance.
CO314443.3 Compare different types of classification models and their relevant application.
CO314443.4 Illustrate the tree-based and probabilistic machine learning algorithms.
CO314443.5 Identify different unsupervised learning algorithms for the related real-world problems.
CO314443.6 Apply fundamental concepts of ANN.

Subject 4: Human computer Interaction (314444)
At the end of this course, Students will be able to
CO314444.1 Explain importance of HCI study and principles of user-centered design (UCD) approach.

CO314444.2 Develop understanding of human factors in HCI design.
CO314444.3 Develop understanding of models, paradigms, and context of interactions.
CO314444.4 Design effective user-interfaces following a structured and organized UCD process.
CO314444.5 Evaluate usability of a user-interface design.
CO314444.6 Apply cognitive models for predicting human-computer-interactions.

Subject 5: Elective -I: Design and Analysis of Algorithm (314445A)
At the end of this course, Students will be able to
CO314445A.1 Calculate computational complexity using asymptotic notations for various algorithms.
CO314445A.2 Apply Divide & Conquer as well as Greedy approach to design algorithms.
CO314445A.3 Understand and analyze optimization problems using dynamic programming.
CO314445A.4 Illustrate different problems using Backtracking.
CO314445A.5 Compare different methods of Branch and Bound strategy.
CO314445A.6 Classify P, NP, NP-complete, NP-Hard problems.

Subject 5: Elective -I: Advanced Database Management System (314445B)
At the end of this course, Students will be able to
CO314445B.1 Differentiate relational and object-oriented databases.
CO314445B.2 Illustrate parallel & distributed database architectures.
CO314445B.3 Apply concepts of No SQL Databases.
CO314445B.4 Explain concepts of data warehouse and OLAP technologies.
CO314445B.5 Apply data mining algorithms and various software tools.
CO314445B.6 Comprehend emerging and enhanced data models for advanced applications.

Subject 5: Elective -I: Design Thinking (314445C)
At the end of this course, Students will be able to
CO314445C.1 Identify need and features of design thinking.
CO314445C.2 Identify the opportunities and challenges for design thinking innovation.
CO314445C.3 Learn the process of design thinking using various tools.
CO314445C.4 Summarize and learn the various prototyping techniques.
CO314445C.5 Enlist the activities carried out in Test and reflect phase of design thinking.
CO314445C.6 Interpret the design thinking disruptive innovations through case studies.

Subject 5: Elective -I: Internet of Things (314445D)
At the end of this course, Students will be able to
CO314445D.1 Discuss fundamentals, architecture and framework of IoT.
CO314445D.2 Select suitable sensors and actuators for real time scenarios.
CO314445D.3 Justify the significance of protocol for wireless communication and IoT challenges
CO314445D.4 Understand the Python programming for development of IoT applications.
CO314445D.5 Understand the cloud interfacing technologies.
CO314445D.6 Design and Implement real time IoT applications.

TE – Sem II

Subject 1: Computer Network & Security (314451)
At the end of this course, Students will be able to
CO314451.1. Explain Responsibilities, services offered and protocol used at application layer of network

CO314451.2. Apply concepts of wireless network and different wireless standards.
CO314451.3. Recognize the Adhoc Network's MAC layer, routing protocol and Sensor network Architecture.
CO314451.4. Implement the principal concepts of network security and Understand network security Threats, security services, and countermeasures
CO314451.5. Apply basic cryptographic techniques in application development.
CO314451.6. Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe Typical threats to modern digital systems.

Subject 2: Data Science and Big Data Analytics (314452)
At the end of this course, students will be able to:
CO314452.1. Understand Big Data primitives.
CO314452.2. Learn and apply different mathematical models for Big Data.
CO314452.3. Demonstrate Big Data learning skills by developing industry or research applications.
CO314452.4. Analyze and apply each learning model comes from a different algorithmic approach And it will perform differently under different datasets.
CO314452.5. Understand, apply and analyze needs, challenges and techniques for big data visualization.
CO314452.6. Learn different programming platforms for big data analytics.

Subject 3: Web Application Development (314453)
At the end of this course, students will be able to:
CO314453.1. Develop Static and Dynamic website using technologies like HTML, CSS, and Bootstrap.
CO314453.2. Demonstrate the use of web scripting languages.
CO314453.3. Develop web application with Front End & Back End Technologies.
CO314453.4. Develop mobile website using JQuery Mobile.
CO314453.5. Deploy web application on cloud using AWS.

Subject 4: Elective-II Artificial Intelligence (314454A)
At the end of this course, Students will be able to
CO314454A.1. Apply the fundamental concepts of Artificial Intelligence
CO314454A.2. Choose appropriate search strategies for any AI problem
CO314454A.3. Illustrate knowledge reasoning and knowledge representation methods (for solving real world problems)
CO314454A.4. Analyze the suitable techniques of NLP to develop AI applications
CO314454A.5. Correlate the appropriate methods of Game Theory to design AI applications
CO314454A.6. Understand the concept of deep learning and AI applications

Subject 4: Elective-II Artificial Intelligence (314454B)
At the end of this course, Students will be able to
CO314454B.1. Develop basic understanding of cyber security.
CO314454B.2. Differentiate among different types of cyber threats and cyber-crimes.
CO314454B.3. Illustrate cyber forensic techniques to identify the criminal activities.
CO314454B.4. Apply forensic analysis tools to recover important evidence for identifying computercrime
CO314454B.5. Distinguish and classify the forms of cybercriminal activity and the technological and Social engineering' methods used to undertake such crimes
CO314454B.6. Evaluate the effectiveness of cyber-security, cyber-laws and other countermeasures against cybercrime

Subject 4: Elective-II Cloud Computing (314454C)

At the end of this course, Students will be able to

CO314454C.1 Articulate the main concepts, key technologies and fundamentals of cloud computing.
CO314454C.2 Understand cloud enabling technologies and virtualization.
CO314454C.3 Analyze various cloud programming models and apply them to solve problems on the cloud.
CO314454C.4 Explain data storage and major security issues in the cloud.
CO314454C.5 Understand trends in ubiquitous cloud and internet of things.
CO314454C.6 Explore future trends of cloud computing.

Subject 4: Elective-II Software Modeling & Design (314454D)

At the end of this course, Students will be able to

CO314454D.1 Understand basics of object oriented methodologies and Unified Modeling Language (UML).
CO314454D.2 Apply analysis process, use case modeling, domain/class modeling
CO314454D.3 Design and apply interaction and behavior modeling on a given system.
CO314454D.4 Comprehend OO design process and business, access and view layer class design.
CO314454D.5 Recognize the software design principles and patterns to be applied on system.
CO314454D. 6 Illustrate architectural design principles and guidelines in the various type of application development

BE – Sem I

Subject 1: Information Storage & Retrieval (414441)

At the end of this course, students will be able to

CO414441.1. Understand the concept of Information retrieval and to apply clustering in information retrieval.
CO414441.2. Use an indexing approach for retrieval of text and multimedia data.
CO414441.3. Evaluate performance of information retrieval systems.
CO414441.4. Apply the concepts of multimedia and distributed information retrieval.
CO414441.5. Use appropriate tools in analyzing the web information
CO414441.6. Simulate the working of a search engine and recommender system.

Subject 2: Software Project Management (414442)

At the end of this course, Students will be able to

CO414442.1. Apply the practices and methods for successful Software Project Management
CO414442.2. Create Design and Evaluate Project.
CO414442.3. Analyze Project Schedule and calculate Risk Management with help of tools.
CO414442.4. Demonstrate different tools used for Project Tracking, Monitoring & Control.
CO414442.5. Identify Staff Selection Process and the issues related to Staff management.
CO414442.6. Discuss and use modern tools for Software Project Management.

Subject 3: Deep Learning (414443)

At the end of this course, Students will be able to

CO414443.1. Understand the theoretical foundations, algorithms, and methodologies of Deep Learning.
CO414443.2. Apply the concepts of Convolution Neural Networks and use of popular CNN architectures.

CO414443.3. Compare Feed Forward Neural Network and Recurrent Neural Network and learn modeling the time dimension using RNN and LSTM.
CO414443.4. Elaborate unsupervised deep learning algorithms like Autoencoders.
CO414443.5. Explore Representation Learning and Transfer Learning techniques using variants of CNN architecture.
CO414443.6. Evaluate the performance of deep learning algorithms and to provide solution for various real-world applications.

Subject 4: Elective – III (Mobile Computing) (414444)
At the end of this course, Students will be able to
CO414444A.1. Understand the basic concepts of mobile computing, MAC and different multiplexing technics.
CO414444A.2. Understand Protocols, Connection Establishment, Frequency Allocation, and Routing of mobile telecommunication system like GSM, GPRS, and UMTS.
CO414444A.3. Understand the Generations of Mobile Communication Technologies.
CO414444A.4. Earn mobile IP,Adhoc– Network, Reactive Routing protocols, Multicast Routing.
CO414444A.5. Obtaining knowledge of transport layer protocol TCP, File System, and different Application layer protocols.
CO414444A.6. Gain knowledge about different mobile platforms, operating Systems, Software Development Kit, Security Issues

Subject 5: Elective – III High Performance Computing (414444 B)
At the end of this course, Students will be able to
CO414444B.1. Understand concepts of parallel computing, its application areas and parallel Computing platforms
CO414444B.2. Apply different Parallel programming paradigm and Decomposition Techniques.
CO414444B.3. Correlate various communication calls.
CO414444B.4. Analyze and Measure different Performance Metrics.
CO414444B.5. Perform CUDA Programming.
CO414444B.6. Build the logic to develop parallel algorithms for high performance computing.

Subject 6: Elective – III Multimedia Technology (414444 C)
At the end of this course, Students will be able to
CO414444C.1. Understand basic building block and applications of Multimedia.
CO414444C.2. Solve and analyze different algorithms for text and image compression.
CO414444C.3. Classify different audio and video file formats of Multimedia.
CO414444C.4. Apply open-source authoring tools of animation.
CO414444C.5. List various devices used in virtual reality and its use in daily life.
CO414444C.6. Recognize emerging trends in Multimedia.

Subject 7: Elective – III (Smart Computing) (414444 D)
At the end of this course, Students will be able to
CO414444D.1. Demonstrate the knowledge of design of smart computing and its applications.
CO414444D.2. Describe different generations of mobile and mobile computing projects.
CO414444D.3. Demonstrate the knowledge of design of Ubicomp and its applications.
CO414444D.4. Explain smart devices and services used Ubicomp.
CO414444D.5. Implement interfacing of various sensors, actuators to the development boards.
CO414444D.6. Compare various IoT communication technologies and smart computing applications.

Subject 8: Elective – IV Bioinformatics (414445A)

At the end of this course, Students will be able to

CO414445A.1. Integrate biological concepts with information technologies to study the biological system.

CO414445A.2. Study Gene structure, various biological database, and methods to manage the different types of biological data.

CO414445A.3. Describe principles and algorithms of pairwise and multiple alignments.

CO414445A.4. Study various bioinformatics tools and Algorithm.

CO414445A.5. Understand modeling and simulation in bioinformatics, drug discovery process and Protein Structure.

CO414445A.6. To Gain awareness in field of System Biology and Human Disease.

Subject 09: Elective – IV Introduction to DevOps (414445B)

At the end of this course, Students will be able to

CO414445B.1. Understand the fundamental concepts of DevOps.

CO414445B.2. Link the background of DevOps with other technologies

CO414445B.3. Comprehend the concept of continuous integration and continuous delivery.

CO414445B.4. Compare various stages of continuous deployment and test strategies

CO414445B.5. Justify the importance of monitoring system and reliability engineering.

CO414445B.6. Use the latest tools in DevOps.

Subject 10: Elective – IV Computer Vision (414445 C)

At the end of this course, Students will be able to

CO414445C.1. Implement fundamental image processing techniques required for computer vision.

CO414445C.2. Apply feature extraction techniques.

CO414445C.3 Apply Hough Transform for line, circle, and ellipse detections.

CO414445C.4. Understand three-dimensional analysis techniques.

CO414445C.5. Develop skills to develop applications using computer vision techniques.

Subject 11: Elective – IV Wireless Communication (414445D)

At the end of this course, Students will be able to

CO414445D.1. Articulate the fundamental concept of cellular system.

CO414445D.2. Analyse the fundamentals of cellular systems.

CO414445D.3. Illustrate multiple access technique for effective utilization of spectrum.

CO414445D.4. Design and analyse the WAP Programming Model in networking environment.

CO414445D.5. Learn and understand security issues, challenges and tools in wireless communication.

CO414445D.6. Explore the emerging trends and applications in wireless communication.

BE – Sem II

Subject 1: Distributed System (414450)

At the end of this course, Students will be able to

CO414450.1. Demonstrate the core concepts of distributed systems.

CO414450.2. Understand the concept of middleware of distributed systems.

CO414450.3. Understand Inter-process communication methods and analyze different coordination algorithms.

CO414450.4. Comprehend the importance of replication to achieve fault tolerance in distributed systems.

CO414450.5 Analyze the design and functioning of existing distributed file systems, distributed multimedia, and distributed web-based systems.
CO414450.6. Understand various Recent Trends in distributed systems.

Subject 2: Elective-V Software Defined Network (414451A)
At the end of this course, Students will be able to
CO414451A.1 Acquire fundamental knowledge of SDN exploring the need, characteristics, and **a**rchitecture of SDN and methods of API's in SDN.
CO414451A.2 Recognize Open Flow protocols and its forwarding, pipeline model and use cases of SDN controller.
CO414451A.3 Demonstrate virtualization and Cloud computing services of SDN.
CO414451A.4 Comprehend IT Infrastructure and understand the data center in SDN.
CO414451A.5 Analyse various security issues and challenges in SDN
CO414451A.6 Comprehend SDN application areas and future.

Subject 3: Elective- V Social Computing (414451B)
At the end of this course, Students will be able to
CO414451B.1. Understand basics of Social Media Analytics
CO414451B.2. Correlate Network Measures for Social Media Data
CO414451B.3. Visualize mining in social media data
CO414451B.4. Discuss the Social Similarities
CO414451B.5. Interpret social media behavior.
CO414451B.6. Apply Social Media Computations for Google+ interface.

Subject 4: Elective- V Natural Language Processing (414451C)
At the end of this course, Students will be able to
CO414451C.1. Understand and analyze the natural language text and model.
CO414451C.2. Analyze the natural language syntactically.
CO414451C.3. Analyze and study natural language logically.
CO414451C.4. Process the natural language text based on relations and knowledge.
CO414451C.5. Evaluate the natural language text using models and apply modeling techniques for automatic document separation and text mining.
CO414451C.6. Apply information retrieval techniques.

Subject 5: Elective-V Soft Computing (414451D)
At the end of this course, Students will be able to
CO414451D.1. Learn soft computing techniques and their roles in problem solving.
CO414451D.2. Understand and Analyze various Artificial neural network techniques
CO414451D.3. Understand and define the fuzzy systems for problem solving.
CO414451D.4. Understand and apply the concepts of genetic algorithms for problem solving.
CO414451D.5. Identify and select a suitable Soft Computing method to solve the problem
CO414451D.6. Identify and understand the role of soft computing models in various applications

Subject 6: Elective- V Game Engineering (414451E)
At the end of this course, students will be able to
CO414451E.1. Describe fundamentals of game engineering and the social- ethical issues in game development.
CO414451E.2. Develop creative and critical thinking skills for designing compelling games.
CO414451E.3. Apply game mechanics to make game more enjoyable.

CO414451E.4. Analyze Games over Networks and Peer Effects.
CO414451E.5. Demonstrate an understanding of various tools that are used in game development.
CO414451E.6. Apply mathematical and game programming knowledge and skills to solve development tasks.

Subject 7: Elective VI- Ethical Hacking and Security (414452A)
At the end of this course, students will be able to
CO414452A.1. Identify Ethical hacking processes and become acquainted with Penetration testing.
CO414452A.2. Recognize Foot printing techniques and apply in real time applications
CO414452A.3. Build knowledge about Meta sploit tool with Kali Linux.
CO414452A.4. Differentiate Privilege Escalation in Windows and Linux.
CO414452A.5. Construct Secure Web Applications to understand Hacking Techniques.
CO414452A.6. Recognize Wifi Hacking and Security techniques.

Subject 8: Elective-VI Augmented and Virtual Reality (414452B)
At the end of this course, students will be able to
CO414452B.1. Analyze how Virtual Reality systems work.
CO414452B.2. Understand the representation of Virtual world.
CO414452B.3. Describe the importance of motion and tracking in VR systems.
CO414452B.4. Analyze how AR systems work and list the applications of AR.
CO414452B.5.Identify the working of various AR components and AR devices.
CO414452B.6.Make use of computer vision concepts for AR.

Subject 9: Elective-VI Business Analytics and Intelligence (414452C)
At the end of this course, students will be able to
CO414452C.1. Apply conceptual knowledge on how Business Intelligence is used in decision making process
CO414452C.2. Use modelling concepts in Business Intelligence.
CO414452C.3. Understand and apply the concepts of business reports and analytics with the help of visualization for business performance management
CO414452C.4. Comprehend the model-based decision making using prescriptive analytics.
CO414452C.5. Analyze the role of analytics and intelligence in Business.
CO414452C.6. Comprehend different Business Intelligence trends and its future impacts

Subject 10: Elective-VI Blockchain Technology (414452D)
At the end of this course, students will be able to
CO414452D.1. Understand the concept of cryptography and decentralization.
CO414452D.2. Acquire fundamental knowledge of blockchain with issues associated with it.
CO414452D.3 . Acquire knowledge of Ethereum blockchain platform.
CO414452D.4. Understand hyper ledger fabric platform.
CO414452D.5 . Acquire the knowledge regarding working of tokenization.
CO414452D.6. Describe the applications and risk involved.