Bachelor of Software Engineering Honours - 2019

AGM3263 Communication Skills

Level	3
Course Code	AGM3263
Course Title	Communication Skills
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	To enhance reading, writing and presentation skills for effective communication
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1:** Communicate technical and engineering issues effectively with professional groups and the society at large. **CLO2:** Collect process and interpret information and data relevant for a particular application. **CLO3:** Summarize and present relevant aspects of scientific/ technical project proposals or project reports useful for a particular application.
Content	**Outline Syllabus:** Unit 1 : Work related communication Unit 2 : Developing Reading and Writing Skills Unit 3 : Data Gathering Interpretation Unit 4 : Presentation Skills **Laboratory Work (Workshops):** 1. How to write a project proposal 2. Scientific report writing 3. How to make an effective presentation

EEI3262 Introduction to Object Oriented Programming

Level	3
Course Code	EEI3262
Course Title	Introduction to Object Oriented Programming
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	To write programs in Java by applying object oriented concepts with appropriate error handling and code refactoring techniques for a given scenario.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1:** Explain the impact of object oriented paradigm over major programming paradigms, object oriented principles and how object oriented programming evolved. **CLO2:** Apply code refactoring techniques and naming standards to refine the source code in written programs. **CLO3:** Develop solutions for a given set of problems in Java using appropriate object oriented concepts and exception handling techniques.
Content	**Outline Syllabus:** Unit 1: Introduction to Object Oriented Programming Unit 2: Object Oriented Concepts **Laboratory Work** 1. Write simple Java programs to get familiar with Java control structures, class and method declarations, and refactoring techniques. 2. Write simple Java programs to get familiar with access specifiers, constructor, initializing an object, instantiation of an object, message passing and mutator methods. 3. Write simple Java programs to illustrate more examples with message passing, inheritance, overriding and overloading. 4. Write a console Java program to solve a given problem by applying object oriented concepts to achieve code reuse.

EEI3346 Web Applications Develop

Level	3
Course Code	EEI3346
Course Title	Web Applications Development
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To develop simple web applications using fundamental concepts, technologies and techniques.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to **CLO1:** Identify the fundamental concepts of networking, internet, www and web applications. **CLO2:** Explain the building blocks of an internet application. **CLO3:** Apply the knowledge gained to develop a simple internet application: HTML, CSS, JavaScript, and Java. **CLO4:** Examine tools and best practice for designing, creating and deploying web applications. **CLO5:** Assess cost, reliability, availability and security related to an internet application.
Content	**Outline Syllabus:** Unit 1: Introduction to web programming Unit 2: HTML Unit 3: CSS Unit 4-6: JavaScript Unit 7: jQuery Unit 8: AngularJS Unit 9: Web Security **Laboratory Work** 1. Introduction to the Html Code editors 2. Use HTML5 to define the layout of the webpages. 3. Use CSS3 to specify the layout of the webpages. 4. Practice program using JavaScript to manipulate the behaviors of webpages. 5. Use Java server to create dynamic webpages **Mini Project** Design and implement a dynamic webpage for a simple scenario.

EEI3266 Information Systems and Data Management

Level	3
Course Code	EEI3266
Course Title	Information Systems and Data Management
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	To design and implement a database and present useful information in appropriate formats.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to : **CLO1:** Describe the evolution of different types of Information systems. **CLO2:** Develop Entity Relationship (ER) models using basic concepts of ER diagrams for database modeling. **CLO3:** Design relational database schema in ER model using the normal forms (NF). **CLO4:** Implement a database using suitable DBMS. **CLO5:** Present analyzed data to interpret useful information using appropriate formats.
Content	**Outline Syllabus:** Unit 1 : Evolution of Information systems Unit 2: Introduction to Database Unit 3: Database Analysis and Design Unit 4: Database Users, Data manipulation & interpretation and visual presentation **Laboratory Work** 1. Use MSAccess and create database and perform data manipulation. Practice to create database and data manipulation and create reports 2. Demonstrate MySQL and create Database and perform data manipulation. Practice basic SQL commands for DML and DDL. 3. Practice more SQL commands and functions in MySQL. Retrieve data from different tables using 'join' commands. 4. Demonstrate data interpretation and visualization using MsAccess and MsExcel **Case Study** Analyze requirements and developa solution for a simple problem in the specified problem domain

EEX3373 Communications and Computer Technology

Level	3
Course Code	EEX3373
Course Title	Communications and Computer Technology
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To provide knowledge on fundamentals of computer technology, networking and communication.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to **CLO1:** Describe the evolution of microprocessors and computer models, and their applications to solve real-world problems. **CLO2:** Describe basic components of a microprocessor and their operations with reference to different Instruction Set Architectures (ISAs), and peripherals used in computers. **CLO3:** Build a personal computer connected to a network using basic components and peripherals. **CLO4:** Write a simple program using a given ISA and simulate its operation in fetch-execute cycle. **CLO5:** Perform simple arithmetic calculations in different number systems for a given problem. **CLO6:** Describe the fundamentals of computer networking, Internet and Internet services, and how OSI reference model is applicable in a computer network. **CLO7:** Explain security threats and preventive & recovery measures in computers and computer networks. **CLO8:** Identify components commonly used in wired and wireless communication systems. **CLO9:** Perform basic calculations related to analog and digital modulation techniques and power in communication systems.
Content	**Outline Syllabus:** Unit 1: Computer Technology Unit 2: Computer Communications **Laboratory work** 1. Identify the basic components and peripherals of a personal computer and their functions. 2. Perform assembling of a personal computer, installing operating system. 3. Study the fetch-execute cycle for a given assembly program. 4. Implement a simple network and get it connected to a LAN and hence to the internet. 5. Verify the functions at transmitter and receiver ends using amplitude modulation.

EEX3467 Software Engineering Concepts and Programming

Level	3
Course Code	EEX3467
Course Title	Software Engineering Concepts and Programming
Credit value	4
Core/Optional	Core (Computer)
Course Aim/s	Impart knowledge on how to apply fundamental concepts of programming to develop a software application to solve a problem as one of the main activities in software development life cycle.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1:** Demonstrate the ability to gather requirements to develop a software solution. **CLO2**: Describe an algorithmic solution to a problem using pseudo code and flowcharts. **CLO3:** Design a solution to a problem using structured design principles and object oriented design principles. **CLO4:** Applies fundamental concepts of programming to write, test, debug and deploy computer programs. **CLO5:** Describe security threats for software and the basic techniques to make software secure. **CLO6:** Select appropriate software development model for the development and maintenance of diverse software products. **CLO7:** Describe how basic concepts in project management can be applied to a software project.
Content	**Outline Syllabus:** Unit 1 : Introduction to Software Engineering Concepts Unit 2 : Data Structures and Algorithms Unit 3 : Object Oriented Concepts **Laboratory Work** 1. Design an algorithm using a flow chart for a given problem, write the solution using C programming language following coding standards, execute and debug the program. **Mini Project** Find a client, gather requirements, and analyze requirements, design, implement and test the solution for a simple problem in the specified problem domain.

MHZ3459 Basic Mathematics for Computer Engineering

Level	3
Course Code	MHZ3459
Course Title	Basic Mathematics for Computer Engineering
Credit value	4
Core/Optional	Core (Computer)
Course Aim/s	Provide a solid fundamental mathematics foundation for the higher level courses assuming that the participating students have no prior sound knowledge in Mathematics.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Use trigonometric identities: ratio, laws of sine and cosine to solve a given problem. **CLO2:** Differentiate different types of functions such as polynomials, logarithms, trigonometric etc. **CLO3**: Integrate different types of functions such as polynomials, logarithms, trigonometric etc. **CLO4:** Solve a given problem using Boolean Algebra. **CLO5:** Solve a given problem using the properties of matrices. **CLO6:** Examine a given data set using basic techniques in probability and statistics. **CLO7:** Analyze the basic solid shapes based on given parameters.
Content	**Outline Syllabus:** Unit 1: Boolean Algebra and Matrix Algebra Unit 2: Trigonometry Unit 3: Numerical Precision, Accuracy and Errors Unit 4: Differentiation and Integration Unit 5: Applications of Probability and Statistics Unit 6: Introduction to Solid Geometry **Laboratory Work:** Analyzing data sets by applying statistical techniques to identify features of the data set.

AGM4367 Economics and Marketing for Engineers

Level	4
Course Code	AGM4367
Course Title	Economics and Marketing for Engineers
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To provide knowledge on the basic economic principles and marketing strategies for engineers.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1:** Describe the nature of economics in dealing with scarcity. **CLO2:** Explain the trade and its advantages. **CLO3:** Perform demand and supply analysis to understand the market mechanisms in an economy. **CLO4:** Analyze the performance of firms under different market structures; recognize market failures and role of the government. **CLO5:** Describe the growth of the economy, its measurements and shortcomings of the measures. **CLO6:** Relate the basic economic concepts in the Sri Lankan economy.
Content	**Outline Syllabus:** Unit 01: Introduction to economics Unit 02: The Market Mechanism Unit 03: Fundamental Concepts of Macroeconomics

EEI4267 Requirements Engineering

Level	4
Course Code	EEI4267
Course Title	Requirements Engineering
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	The Aim of the course is to develop competencies of the students to successfully practice requirement engineering tools and techniques as part of the software development life cycle.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply requirement engineering theory, principles, tools and processes, as an essential activity in software development life cycle. **CLO2**: Analyze collected requirements using the learnt techniques **CLO3**: Design suitable methods to validate a requirement. **CLO4**: Develop System Requirements Specification using standard practices and appropriate documentation techniques. **CLO5**: Demonstrate broad knowledge of requirements engineering related to software development following professional standards.
Content	**Outline Syllabus:** Unit 1: Introduction to Software Requirements Unit 2: Requirement Engineering Unit 3: Requirement Documentation **Mini Project** After completing the mini project students will be able to: LO1 - Demonstrate their ability to identify and analyze requirements of a software system LO2 - Validate a given set of requirements LO3 - Present the system requirements using standard practices LO4 - Manage requirements subject to continual change

EEI4361 User Experience Engineering

Level	4
Course Code	EEI4361
Course Title	User Experience Engineering
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	Teach the students the concepts of Human Computer Interaction (HCI) with blend of theory and practices pertaining to the study of Software Engineering.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1:** Explain the theories of human-computer interaction and theoretical aspects of user interfaces. **CLO2:** Apply user interface design techniques in software engineering. **CLO3:** Carry out usability testing with usability engineering techniques. **CLO4:** Design real world applications at varying levels of fidelity from paper prototypes to functional, interactive prototypes.
Content	**Outline Syllabus:** Unit 1: Fundamentals of HCI Unit 2: Design and implementation with HCI **Mini Project** Design, integrate, practice and evaluate the concepts of HCI for a given problem that might improve the interfaces and implement a final product.

EEI4362 Object Oriented Design

Level	4
Course Code	EEI4362
Course Title	Object Oriented Design
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	Design and develop software solution/s by applying appropriate object oriented concepts, design patterns and frameworks.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply the basic concepts of object oriented design and programming for a given scenario. **CLO2**: Explain how abstraction mechanisms support the creation of reusable software components. **CLO3**: Perform object oriented design and analysis on real world problems. **CLO4**: Document the design solutions with UML notations and diagrams. **CLO5**: Select appropriate software design patterns and frameworks for different problems.
Content	**Outline Syllabus:** Unit 1: Programming Concepts Unit 2: Application of Object Oriented Concepts Unit 3: Object-oriented Analysis and Design Unit 4: Design Patterns and Frameworks Unit 5: Application Development **Labs** 1. Write simple java programs to get familiar with Java control structures, class and method declarations, and refactoring techniques. 2. Write simple java programs to illustrate applying OOP concepts 3. Use of API, Interfaces and abstract classes 4. Write a Multithreaded programming 5. 4. Using Hibernate, Object Relational Mapping, use of Factory and Abstract factory design pattern,

EEI4346 Web Technology

Level	3
Course Code	EEI4346
Course Title	Web Technology
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To build dynamic and interactive web applications using evolving technologies.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply markup languages for processing, identifying, and presenting of information in web pages. **CLO2**: Apply scripting languages and web services to transfer data and add interactive components to web pages. **CLO3**: Design websites using appropriate security principles, focusing specifically on the Vulnerabilities inherent in common web implementations. **CLO4**: Apply fundamental techniques to maintain web server services required to host a website.
Content	**Outline Syllabus:** Unit 1: Overview of Internet Applications Unit 2: Client Side Programming Unit 3: Server Side Programming with PHP and web services Unit 4: Enterprise Integration **Laboratory Work** 1. Use HTML5 and CSS3 to define and specify the layout of the webpages. 2. Develop programs using technologies involved in client side programming 3. Practice programs using AJAX in a browser to request data from the server. 4. Develop programs using technologies involved in server side programming.

EEI4366 Data Modelling and Database Systems

Level	4
Course Code	EEI4366
Course Title	Data Modelling and Database Systems
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	Apply appropriate data modeling techniques to design a database system using DBMS for a real-world scenario.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO 1**: Design a relational model through conceptualized EER and refine using the normal forms (NF) to reduce redundancy and improve data integrity. **CLO2**: Implement the relational database design in an appropriate DBMS with database storage structures and access techniques. **CLO3**: Use SQL to create, manipulate and query a database. **CLO4**: Explain the role of a database administrator. **CLO5**: Design a database system for web applications.
Content	**Outline Syllabus:** Unit 1: Database Systems and Data Modeling Techniques Unit 2: Database file Organization Unit 3: Database Operations Unit 4: Database Administration Unit 5: Databases for Web Applications **Laboratory Work:** 1. Create tables and write queries to extract data 2. Create views and triggers 2. Use appropriate SQL - Stored Procedures. 3. Design Create XML - a Web application using XML. **Mini Project** Design a normalized relational database for a given case and implement using an appropriate DBMS.

EEX4465 Data Structures and Algorithms

Level	4
Course Code	EEX4465
Course Title	Data Structures and Algorithms
Credit value	4
Core/Optional	Core (Computer)
Course Aim/s	Formulate and implement an algorithm using appropriate data structures to provide solutions for given problems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Use appropriate data structures in building real world software application systems. **CLO2**: Design algorithms for solving complex problems in an efficient manner. **CLO3**: Evaluate the complexity and the efficiency of different algorithms applicable to a specific scenario. **CLO4**: Implement algorithms using a suitable programming language/s .
Content	**Outline Syllabus:** Unit 1: Algorithms Unit 2: Fundamental Data Structures Unit 3: Sorting and Searching Unit 3: Advance Data Structures Unit 4: Theory of Algorithms **Laboratory Work:** 1. Implement basic data structures using a programming language 2. Demonstrate the application of sorting and searching methods for a given dataset 3. Implement trees and graph data structures. **Mini Project** Apply and implement appropriate data structures and algorithms to device a solution for a given real world problem scenario.

EEY4189 Software Design in Groups

Level	4
Course Code	EEI4189
Course Title	Software Engineering in Group
Credit value	1
Core/Optional	Core (Computer)
Course Aim/s	To instill in the students the competency to methodologically investigate problems in software systems, determine the real nature of them and suggest possible solutions with a team approach.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: To systematically investigate the problems or issues in software systems to identify the root causes while working in a team. **CLO2**: To suggest possible solutions to the problems by applying concepts and principles and evaluate the alternatives with a justifiable criterion. **CLO3**: To communicate successfully, the results of investigation, suggested solutions and arguments to stakeholders.
Content	**Outline Syllabus:** Unit 1: Problem Identification Unit 2: Design Unit 3: Development

MHZ4377 Applied Statistics

Level	4
Course Code	MHZ4377
Course Title	Applied Statistics
Credit value	3
Core/Optional	Optional
Course Aim/s	To make students apply the knowledge in statistical techniques to solve industrial engineering problems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Make design and management decisions based on a good understanding of probability and statistics. **CLO2**: Design and conduct experiments to evaluate hypotheses. **CLO3**: Analyze data from variety of sources.
Content	**Outline Syllabus:** Unit 1: Introduction to Statistics Unit 2: Probability and Probability Distributions Unit 3: Statistical inference Unit 4: Correlation and Regression Unit 5: Statistical Computing

MHZ4256 Mathematics for Computing

Level	4
Course Code	MHZ4256
Course Title	Mathematics for Computing
Credit value	2
Core/Optional	Optional
Course Aim/s	To make students to apply the knowledge in mathematical logic, sets, relations, rules of Boolean algebra and complex numbers to solve Engineering problems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Express an argument using standard operators of logic and use the laws of logic to arrive at possible conclusions. **CLO2**: Apply the methods of proof to formulate mathematical solutions. **CLO3**: Express given physical situations using sets, relations and functions. **CLO4**: Apply the rules of Boolean algebra and Karnaugh Maps for simplifying logic circuits. **CLO5**: Verify properties of complex numbers, and identify the Argand plane.
Content	**Outline Syllabus:** Unit 1: Logic Unit 2: Sets, Relations and Functions Unit 3: Rules of Boolean Algebra and Karnaugh Maps Unit4: Complex Numbers

CVM5402 Accounting for Engineers

Level	5
Course Code	CVM5402
Course Title	Accounting for Engineers
Credit value	4
Core/Optional	Core (Computer)
Course Aim/s	To provide knowledge of terms, principles, procedures and techniques in Accounting in Engineering context.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**:Explain the overall purpose of learning accounting by engineering professionals and describe the purpose of Accounting Equation and its importance. **CLO2**:Explain the different situations where source documents that are used for accounting can be adopted. **CLO3**:Describe how to do accounting for purchasing and supplying, and how to do accounting for stocks and depreciation. **CLO4**:Explain how to prepare a Trail Balance and the reasons for preparing a Trial Balance. **CLO5**:Explain the procedure of preparing the Trading Account and the Profit and Loss Account and the purposes of these two accounts. **CLO6**: Outline the broad concept of what Cost and Management Accounting is and elaborate on the key concepts in cost accounting. **CLO7**: Describe different methods of pricing and return on investment. **CLO8**: Outline the concept of Capital Budgeting and explain Risk Management in Accounting and describe Social and Environmental Accounting.
Content	**Outline Syllabus:** Unit 01: Introduction to Accounting Unit 02: Source Documents Unit 03: Types of Accounts 1 Unit 04: Types of Accounts II Unit 05: Cost Accounting Unit 06: Pricing and Capital Budgeting **Mini Project:** Both mini projects-exercises have been designed in such a manner that the student is expected to: 1. Comprehend the mini project exercise, work out a strategy to execute the mini project exercise and clearly identify the different steps of the process of executing the exercise. 2. Decide on a separate methodology for each step of the mini project exercise and carry out the mini project exercise. 3. Analyze the answers/responses/data received and write the mini project report.

EEI5467 Software Testing and Quality Assurance

Level	5
Course Code	EEI5467
Course Title	Software Testing and Quality Assurance
Credit value	4
Core/Optional	Core (Computer)
Course Aim/s	To develop competencies of students to apply principles and concepts of testing and quality assurance to perform as a professional in software development process.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Demonstrate the ability to plan tests including the selection of techniques and methods to be used to validate the product against its approved requirements and design. **CLO2**: Demonstrate the ability to execute tests, design test cases; use test tools; and monitor testing to ensure correctness and completeness in a software quality assurance team. **CLO3**: Apply different testing techniques in an effective and efficient manner to test different software problems. **CLO4**: Analyse a software process to evaluate how effective it is at promoting quality. **CLO5**: Identify industry wide quality standards and processes to apply in different type of businesses.
Content	**Outline Syllabus:** Unit 1: Introduction to Software Quality Assurance Unit 2: Software Testing Process Unit 3: Requirement Validation and Reviews Unit 4: Project Risk Management by Software Testing and Quality Assurance Unit 5: Testing types and techniques Unit 6: Test Artifacts, Tools and Automation Unit 7: Quality Standards and Processes **Case Study:** Provide a critical analysis based on a comprehensive literature survey on a selected topic.

EEX5270 Information Security

Level	5
Course Code	EEX5270
Course Title	Information Security
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	To impart the knowledge of principles and practices of how information security functions in an organization.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Describe the information security overview relating to the history, standards, governance and regulations. **CLO2**: Describe the vulnerabilities relating to technical and human factors in information security. **CLO3**: Demonstrate the relationship between information security and risk management. **CLO4**: Describe algorithms and measures for enhancing security. **CLO5**: Distinguish strategic and tactical design issues in information security.
Content	**Outline Syllabus:** Unit 1: Information Security overview Unit 2: Vulnerabilities: technical and human factors Unit 3: Resource protection models, Message authentication codes, Secret and public key cryptography Unit 4: Network and web security Unit 5: Secure Computing **Case Study** Analyze flow of information in an organization and identify the security measures implemented and potential risks

EEX5362 Performance Modelling

Level	5
Course Code	EEX5362
Course Title	Performance Modelling
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	Teach the students the process of simulating various user and system loads against varying system configurations.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Select appropriate evaluation techniques, performance metrics and workloads for a system. **CLO2**: Understand the mathematical and statistical methods used for performance modelling. **CLO3**: Design measurement and simulation experiments to provide the most information with the least effort. **CLO4**: Use analytic methods and/or simulation to evaluate the performance of computer systems, subsystems, and networks. **CLO5**: Demonstrate the ability to describe models, methods, and results in reports of high quality. **CLO6**: Use simple queuing models to analyse the performance of systems.
Content	**Outline Syllabus:** Unit 1 :Performance analysis Unit 2:Data representation, simulation and capacity planning **Mini Project** Perform a study on a system, evaluate and demonstrate based on techniques discussed. **Case Study** Gather data, analyze data and develop a mechanism to monitor the performance for a simple problem in a specified problem domain.

EEX5563 Computer Architecture and Operating Systems

Level	5
Course Code	EEX5563
Course Title	Computer Architecture and Operating Systems
Credit value	5
Core/Optional	Core (Computer)
Course Aim/s	To provide required knowledge and skills of the architecture and operating system of a computer system.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Explain the functions of components, data-path and the control unit of a processor when executing its instructions. **CLO2**: Describe the role of an operating system in managing system resources and interfacing hardware and software elements, and functions of I/O system. **CLO3**: Explain hierarchical memory design, memory organizations and impact of resource management for improving overall performance of a computer system. **CLO4**: Define design parameters of an operating system module to manage the resources of a computer for a given task. **CLO5**: Analyze performance of computer systems considering cost, reliability and security. **CLO6**: Demonstrate the ability to write I/O programs for a target platform.
Content	**Outline Syllabus:** Unit 1: Overview of a Computer System. Unit 2: Performance. Unit 3: Representation of Data and Information. Unit 5: Organization of a Computer System. Unit 6: Managing the Processor. Unit 7: Memory System: Design and Managing. Unit 8: I/O System. Unit 9: Functional Organization. Unit 10: Alternative Architectures. Unit 11: Approaches for performance enhancements. Unit 12: Contemporary architectures. **Activities** 1. Explain the function of a processor and behavior of different components in it. 2. Analyze the ISA of a processor and writing programs using it. 3. Perform arithmetic operations using the given instruction set. 4. Analyze the performance of a processor. 5. Analyze memory management operations in operating systems. 6. Write programs to control peripherals, detect extended memory

EEW5811 Industrial Training – Software Engineering

Level	5
Course Code	EEW5811
Course Title	Industrial training – Software
Credit value	8
Core/Optional	Core (Computer)
Course Aim/s	Aim of this course is to prepare learners for their future employment in the software industry by gaining skills in software engineering practices with an exposure to industrial environment including social and ethical responsibilities.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply the theories, standards, conventions and practices related to software development life cycle in a practical software development environment. **CLO2**: Assimilate corporate culture an adapt to work practices of a given environment. **CLO3**: Contribute as an individual team member in multidisciplinary and multi-cultural teams in industrial environment. **CLO4**: Acquire new knowledge and skills required to function as productive **team** member in industrial environment.
Content	A student should cover the contents of minimum of **four units including Unit 1** from the given units during the training period. Unit 1 : Understand Organizational structure, quality standards and work practices and ethics Unit 2 : Preliminary Study Unit 3 : System Analysis and Design Unit 4 : Prototyping Unit 5 : Program Design and Implementation Unit 6 : Testing & QA Unit 7 : Documentation Unit 8 : Deployment Unit 9 : User Training Unit 10 : Project management

MHJ5372 Technology, Society and Environment

Level	5
Course Code	MHJ5372
Course Title	Technology, Society and Environment
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To explain the interconnectedness of technology with human society and natural environment and to develop the capacity of students to work effectively as engineers in real world situations where both the social and the environmental matter.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Explain the interconnectedness of technology with society, environment and development in designing an engineering solution. **CLO2**: Analyse the power dynamics of research and development in the field of science and technology in Sri Lanka. **CLO3**: Argue the effects of modern technology on climate, health, gender and aesthetics and describe mitigation measures. **CLO4**: Formulate how sustainable development principles can be applied to the production process; formulate attributes for EIAs and SEAs as tools for sustainability.
Content	**Outline Syllabus:** Unit 1: Engineer and Society Unit 1: Engineer and Environment

MHZ5375 Discrete Mathematics

Level	5
Course Code	MHZ5375
Course Title	Discrete Mathematics
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To provide knowledge in elementary number theory, graph theory, dynamic systems and theory of automata for solving problems
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply modular arithmetic to solve sets of simultaneous first order differential equations using Chinese Remainder theorem. **CLO2**: Use binary operation techniques to identify the characteristics of an Abelian group. **CLO3**: Demonstrate the ability to apply basic concepts of graph theory for a given problem. **CLO4**: Describe the concepts of recurrent relation. **CLO5**: Construct finite automata for a given language to verify the program statements.
Content	**Outline Syllabus:** Unit 1: Elementary number theory Unit 2: Introduction to Groups and Homomorphism Unit 3: Graph Theory Unit 4: Dynamical Systems and Fractals Unit 5: Theory of Automata

DMM6661 Management for Engineers

Level	6
Course Code	DMM6661
Course Title	Management for Engineers
Credit value	6
Core/Optional	Core (Computer)
Course Aim/s	Aim of this course is to provide the knowledge of scientific management concepts that enables application of them in the practice of engineering
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply scientific management concepts in organizations with the board knowledge of planning, organizing, implementation and control of activities, programmes or projects. **CLO2**: Recognize and act accordingly the importance of organizational culture and behaviour of individuals. **CLO3**: Manage human resources effectively aimed at realizing the goals of the organization with the knowledge of individual/group behaviour, rights and responsibilities of people. **CLO4**: Engage actively in corporate level planning and deciding the vision and mission of the organization under dynamic environmental situations. **CLO5**: Take and implement well informed decisions based on quantitative methods/analysis together with judgment on prevailing situation while adhering to ethics. **CLO6**: Ensure quality of products and services by implementing well designed systems and procedures with the knowledge of related factors such as technology, costs, productivity, skill of people and market situation.
Content	**Outline Syllabus:** Unit 01: Fundamentals of management Unit 02: Organizational Behavior Unit 03: HR Management Unit 04: Strategic Management Unit 05:Operations Management Unit 06: Project Management Unit 07: Quality and Productivity Management Unit 08: Engineer and Society **Project:** Based on Management concepts as practice in industries

EEI6171 Emerging Technologies

Level	6
Course Code	EEI6171
Course Title	Emerging Technologies
Credit value	1
Core/Optional	Core (Computer)
Course Aim/s	To provide an understanding of emerging technologies, their impact on the society and how to use them to find solutions for today's problems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Exhibit the inquisitiveness to appreciate contemporary and emerging trends. **CLO2**: Critically evaluate contemporary and emerging technologies to assess the impact in a relevant field. **CLO3**: Demonstrate the ability to research and present the findings.
Content	Various contemporary and future trends in technology, delivered by thought leaders such as Industry representatives, leading researchers and other academics.

EEI6360 Software Project Management

Level	6
Course Code	EEI6360
Course Title	Software Project Management
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	To impart knowledge of theory, methods, techniques, tools and best practices in managing projects.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Select and initiate individual projects and portfolios of projects while aligning them tothe organization's strategy; and identify project goals, constraints, Deliverables, performance criteria, control needs, and resource requirements. **CLO2**: Using the appropriate project management tools and technique, in order to achieve project success at all times. **CLO3**: Demonstrate effective organizational leadership and communication skills for managing local and international projects, project teams and stakeholders ensuring a collaborative project environment. **CLO4**: Using the knowledge of sustainable project management concepts and practices; adapt the traditional and modern project management processes to meet the evolving stakeholder and industry needs.
Content	**Outline Syllabus:** Unit 1: Introduction to Project Management. Unit 2: Project Accounts, Project Management Tools and Challenges in modern day Project Management.

EEI6567 Software Architecture and Design

Level	6
Course Code	EEI6567
Course Title	Software Architecture and Design
Credit value	5
Core/Optional	Core (Computer)
Course Aim/s	Disseminate knowledge to apply a wide variety of design patterns, frameworks, and architecture styles in designing enterprise or non-enterprise software
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Formally specify a software architecture design for a system with a specific set of quality requirements. **CLO2**: Use middleware technologies to improve the architecture & design of a software. **CLO3**: Assess designs to ensure the quality requirements have been met measuring the quality metrics. **CLO4**: Modify designs using sound change control approaches. **CLO5**: Use reverse engineering techniques to recapture the design of software. **CLO6**: Document a software architecture . **CLO7**: Provide a comprehensive architecture trade-off analysis for given quality attributes . **CLO8**: Recognize design and architectural patterns in current common industry use.
Content	**Outline Syllabus:** Unit 1: Introduction Unit 2: Modeling Unit 3: Software Design Unit 4: Design strategies Unit 5: Architectural design Unit 6: Detailed Design Unit 7: Evolution Process Unit 8: Evolution Activities Unit 9: Design support tools and evaluation Unit 10: Documenting Software Architecture

EEM6202 Professional Practice

Level	6
Course Code	EEM6202
Course Title	Professional Practice
Credit value	2
Core/Optional	Core (Computer)
Course Aim/s	To apply knowledge and skills within a practical environment considering professional, ethical, legal, security, environmental, social and cultural issues
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Describe professional, ethical, legal, security, environmental, social and cultural issues and responsibilities. **CLO2**: Analyse the local and global impact of computing on individuals, organizations, and society. **CLO3**: Apply current technical concepts and practices in the core information technologies.
Content	**Outline Syllabus:** Unit 1: Basics of engineering solutions, legal, and cultural issues, and intellectual property rights. Unit 2: Professional, ethical, security, and social issues.

EEX6363 Compiler Construction

Level	6
Course Code	EEX6363
Course Title	Compiler Construction
Credit value	3
Core/Optional	Core (Computer)
Course Aim/s	Aim of this course is to provide required knowledge and skills to develop compiler for real applications.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Develop grammar for a compiler by analysing a target application. **CLO2**: Apply the principles of theory of computation to develop the compiler based on the grammar developed. **CLO3**: Create scanner, parser and code generator of the compiler using LEX and YACC tools. **CLO4**: Construct the compiler of the target application. **CLO5**: Validate the constructed compiler with a selected set of samples for the target application.
Content	**Outline Syllabus:** Unit 1: Theory of Computation Unit 2: Engineering a Compiler **Design Project Report** DPR 1 : Identify necessary design parameters to develop compiler in given application Design a suitable grammar to build language for the application DPR 2 : Evaluate grammar applying theory of computation and LEX & YACC tools DPR 3 : Develop a code generator for the given application **Design Project** Apply theory of computation to design a compiler for a target application implement Lexical analyzer, syntax analyzer and code generator for target application Evaluate grammar based on real example to verify the regular expression of the grammar.

EEY6189 Research Methodology and Project Identification

Level	6
Course Code	EEY6189
Course Title	Research Methodology and Project Identification
Credit value	1
Core/Optional	Core (Computer)
Course Aim/s	To provide the students with knowledge of research based approach in providing solutions to engineering problems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Demonstrate the knowledge of types of research designs, quantitative and qualitative forms of research, and use the most appropriate design for a given issue. **CLO2**: Create problem statement, purpose statement, research problem and objective of a research. **CLO3**: Conduct a literature survey effectively in view of information collection with regard to a given issue, critically evaluate outcomes of literature survey, and document them with recognized referencing methods. **CLO4**: Prepare a research proposal based on preliminary investigations. **CLO5**: Describe ethical issues concerning research and identify and avoid such issue in engineering research. **CLO6**: Plan and execute substantially research based projects with innovativeness and initiative and with a personal autonomy and accountability. **CLO7**: Prepare research abstracts and full length articles according to standard formats.
Content	**Outline Syllabus:** Unit 01: Meaning and objectives of research Unit 02: Types of research Unit 03: Literature survey and referencing methods Unit 04: Defining a research problem Unit 04: Prepartion of a research proposal Unit 05: Ethics in research Unit 06: Dessemination of research outcomes and patenting **Activities**: Workshop on research problem formulation

EEY6689 Final Project – Software Engineering

Level	6
Course Code	EEY6689
Course Title	Final Project (Software Engineering)
Credit value	6
Core/Optional	Core (Computer)
Course Aim/s	Aim of this course is to solve an existing problem as a software engineering project during the final year, in order to demonstrate learners' exposure to professional software engineering practice. It should also demand individual analysis and judgment, assessed independently from the work of others. Learners are encouraged to undertake Projects in software engineering or to undertake projects of inter-disciplinary nature.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: To engage with selected information in the research literature to construct new knowledge related to the Research Question, the learner plans to investigate. **CLO2**: To plan out the investigation of a software engineering problem using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions. **CLO3**: To display qualities and transferable skills as well as subject specific skills necessary to communicate successfully, to a specialist audience. **CLO4**: Apply systems engineering principles throughout a computer system's life cycle, including important trade-offs to design a target application. **CLO5**: Reflect capabilities of project management to support development of computer systems including interdisciplinary issues. **CLO6**: To disseminate research findings in a professional and ethical manner.
Content	**Outline Syllabus:** Unit 01: Meaning and objectives of research Unit 02: Types of research Unit 03: Literature survey and referencing methods Unit 04: Defining a research problem Unit 04: Preparation of a research proposal Unit 05: Ethics in research Unit 06: Dissemination of research outcomes and patenting

EEI3269 Introduction to Mobile Application Development

Level	3
Course Code	EEI3269
Course Title	Introduction to Mobile Application Development
Credit value	2
Core/Optional	Optional
Course Aim/s	Impart the knowledge of mobile application development platforms and constituents of a mobile application.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Identify how different features are incorporated in mobile application designs in different mobile platforms. **CLO2**: Select appropriate mobile architecture, development platform and monetize mechanism for a mobile application. **CLO3**: Design mobile application wireframes for the identified software specifications.
Content	**Outline Syllabus:** Unit 1: Overview of Mobile Applications Unit 2: Mobile Operating Systems Unit 3: Mobile Hardware Unit 4: Mobile Application Development Tools **Mini Research:** Carry out a survey and identify how different features are implemented in mobile application designs of multiple mobile platforms. **Design Class:** Apply fundamentals of Android app design, including how to build a simple user interface and handle user input. Come up with an idea, design the wireframes and, select the mobile architecture, development platform and monetize mechanism for a mobile application as a group **Laboratory Work:** Set up the development environment for mobile platforms.

EEI3372 Python Programming

Level	3
Course Code	EEI3372
Course Title	Programming with Python
Credit value	3
Core/Optional	Optional
Course Aim/s	To write programs in python using appropriate techniques in application development for a given scenario.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO 1**: describe multi paradigm nature of Python programming. **CLO 2**: use identifiers, variables, constants, operators, expressions and basic control structures in Python programming. **CLO 3**: use libraries for building graphical user interfaces for python applications. **CLO 4**: implement a Python program by applying appropriate techniques for a given problem.
Content	**Outline Syllabus:** Unit 01: Python programming Unit 02: Mobile Application Development with Python **Laboratory Work:** 1. Write simple python programs to get familiar with python control structures, data structures, functions and strings. 2. Write simple python programs to illustrate more examples with object oriented concepts inheritance, overriding and overloading. 3. Write python program to get familiar with error handling and testing techniques. 4. Design and develop application using python for a given problem.

EEI3668 Multimedia and Graphic Design

Level	3
Course Code	EEI3668
Course Title	Graphics and Interactive Multimedia Design
Credit value	6
Core/Optional	Optional
Course Aim/s	Use appropriate software tools to design and develop multimedia elements
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Identify different file formats associated with graphics, audio, video and interactive multimedia with their characteristics, compatibility and applicability in different media applications. **CLO2**: Select appropriate software tools for designing and developing multimedia elements with compression techniques. **CLO3**: Design and develop aesthetic multimedia elements. **CLO4**: Apply web authoring with multimedia elements.
Content	**Outline Syllabus:** Unit 1: Introduction to Digital Multimedia and Graphics Elements Unit 2: 2D Graphic Design and Development Unit 3: Animation Unit 4: Digital Video Unit 5: Digital Audio Unit 6: 3D Graphics Unit 7: Application of Multimedia **Laboratory Work:** 1. Create vector graphics using graphic software to get familiar with the usage of basic elements of 2D graphics. 2. Create raster images to get familiar with graphic software and to identify the limitations of two different graphic types. 3. Edit set of video shots to produce a story using video editing software. 4. Create 2D animations to get familiar with animation techniques. 5. Model 3D shapes of real world objects, apply texture and key frame based animation and render the models to get familiar with basic 3D modeling techniques. **Design Project** Design and implement a creative graphic element for a given scenario using appropriate design software.

EEM3366 Introduction to Business Studies

Level	3
Course Code	EEM3366
Course Title	Introduction to Business Studies
Credit value	3
Core/Optional	Optional
Course Aim/s	To provide students with the knowledge of the basic theoretical and practical aspects of the operation of various types of business organizations
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Have a holistic understanding of business from ethical, social and global responsible Perspectives. **CLO2**: Describe the role of organizations in meeting the needs and wants of the society. **CLO3**: Recognize different forms of Business Ownership. **CLO4**: Demonstrate knowledge of managing a business including human resource management. **CLO5**: Describehow resources are managed to achieve efficient on going production of goods and services. **CLO6**: Explainthe importance of effective marketing strategies. **CLO7**: Use and evaluate financial and account data. **CLO8**: Identify and solve different types of business problems. **CLO9**: Acquire a range of skills required to create, maintain and grow enterprises.
Content	**Outline Syllabus:** Unit 1: Overview of Business Studies Unit 2: Organizational Behavior Unit 3: Marketing Unit 4: Operational Management Unit 5: Introduction to Accounting

LLI3245 Introduction to Laws of Sri Lanka

Level	3
Course Code	LLI3245
Course Title	Introduction to Laws of Sri Lanka
Credit value	2
Core/Optional	Optional
Course Aim/s	To provide basic knowledge of the legal framework in Sri Lanka including the main areas of law that are applicable in the day to day life
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Understand legal principles and concepts. **CLO2**: Identify laws and legal systems that are applied in Sri Lanka at present. **CLO3**: Understand important statutes applicable to day today life and working environment. **CLO4**: Explain the basic concepts and legal principles in law of contract. **CLO5**: Generate new knowledge based on the principles of sustainable development. **CLO6**: Identify labour issues and fundamental rights with respect to the working environment. **CLO7**: Apply the laws introduced in the course to the actual practice of society.
Content	**Outline Syllabus:** Unit 1: Introduction to General Principles of Law Unit 2: Introduction to contracts Unit 3: Environmental Laws in Sri Lanka Unit 4: Good Governance and Right to Information

EEI4369 Mobile Application Development for Android

Level	4
Course Code	EEI4369
Course Title	Mobile Application Development for Android
Credit value	3
Core/Optional	Optional (Computer)
Course Aim/s	Impart the knowledge to design and develop a mobile application in Android platform
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**:Explain the functionality of components in Android operating system and how the states of an Android activity change when running an Android Mobile Application. **CLO2**:Identify the components and structures of Android activity life cycle, Android operating system and the Android development Environment. **CLO3**:Develop Android mobile applications and deploy in market place. **CLO4**: Analyze the limitations of a mobile application for a given range of mobile devices. **CLO5**:Use different testing tools and techniques to inspect and debug an Android mobile application.
Content	**Outline Syllabus:** Unit 1 : Overview of Android Unit 2 : Android development Unit 3 : Security and privacy **Project Proposal** Prepare a project proposal to solve a problem in a mobile first way. **Design Project Report** 1. Draw the wireframes for the Android Application to solve the selected problem 2. Revised report after identifying the multimedia integration requirements 3. Revised report identifying the location awareness requirements 4. Revised report after identifying reading different sensor data 5. Revised report including the database design **Laboratory Work:** 1. Create an Android project, build simple GUI with Android Studio and run a debuggable version of the app. 2. Integrate multimedia into Android Applications 3. Integrate Android Google Map in Android Applications 4. Use sensors in an Android application 5. Integrate an application with SQLite database **Final Assessment** Demonstrate through the developed application the understanding of the basic concepts of Android.

EEX4373 Data Science

Level	4
Course Code	EEX4373
Course Title	Data Science
Credit value	3
Core/Optional	Optional
Course Aim/s	To equip the students with the ability to applying quantitative modeling, data analysis techniques and principles of data science to the real world problems in developing solutions and effectively communicate results
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**:Acquire data through web-scraping and data APIs . **CLO2**:Analyse data using existing exploratory tools such as clustering and visualization tools. **CLO3**: Apply dimensionality reduction tool, principle component analysis. **CLO4**: Evaluate outcomes and make decisions based on data. **CLO5**: Apply visualizing techniques for presenting results effectively.
Content	**Outline Syllabus:** Unit1: Introduction to Data Science Unit2: Algorithmic approaches Unit3: Applications of Data Science Unit4: Big data Techniques **Laboratory Work** 1. Demonstrate the use of R to analyze data, visualize data and predict using the data science techniques with a focus on reporting and charting.

EEY4489 Higher Diploma Project – Software Engineering

Level	4
Course Code	EEY4489
Course Title	Higher Diploma Project - Software Engineering
Credit value	4
Core/Optional	Optional
Course Aim/s	To instill in the students the competency to methodologically investigate problems in software systems, design and develop possible solutions.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: To systematically investigate the problems or issues in software systems to identify the root causes. **CLO2**: To suggest possible solutions to the problems by applying concepts and principles and evaluate the alternatives with a justifiable criterion. **CLO3**: To communicate successfully, the results of investigation, suggested solutions and arguments to stakeholders. **CLO4**: Reflect capabilities of project management to support development of computer systems including interdisciplinary issues.
Content	**Outline Syllabus:** Unit 1: Problem Identification: Unit 2: Design Unit 3: Development

MHJ4271 History of Technology

Level	4
Course Code	MHJ4271
Course Title	History of Technology
Credit value	2
Core/Optional	Optional
Course Aim/s	To identify technology as a culture dependent process that goes back to ancient times
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Discuss technical functions of ancient technological systems. **CLO2**: Narrate historical developments of ancient technologies in the island within the broader context of advances of ancient technologies in the world. **CLO3**: Identify desirable features of ancient technologies in relation to society, culture and environment. **CLO4**: Illustrate technology as a process that undergo change.
Content	**Outline Syllabus:** Unit1: Introducing Historical Studies in Technology Unit2: Session of History and the way forwards Unit3: Brief History of Information Technology and the Development of Computer

EEI5466 Advanced Database Systems

Level	5
Course Code	EEI5466
Course Title	Advanced Database System
Credit value	4
Core/Optional	Optional
Course Aim/s	To provide knowledge and skills required to use advanced database and evolving technologies to build secure and efficient optimized software systems
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Write relational algebra operations for queries. **CLO2**: Create optimized transactions for a database system. **CLO3**: Identify the database management issues including data integrity, security and recovery. **CLO4**: Describe algorithms and measures for enhancing security. **CLO5**: Describe database storage structures and access techniques. **CLO6**: Design Object-Oriented Databases. **CLO7**: Implement data bases for a real world application using an appropriate DBMS. **CLO8**: Identify emerging data management concepts and technologies.
Content	**Outline Syllabus:** Unit 1: Relational Algebra and Relational Calculus Unit 2: Database query processing Unit 3: Transaction Management Unit 4: Database Design and Tuning Unit 5: Object Relational Databases Unit 6: Advanced data management with Oracle Unit 7: DB Administration and cost estimation Unit 8: Advanced Database applications and Industry trends **Laboratory Work:** 1. Write views, functions, stored procedures and triggers to manipulate database 2. Demonstrate the use of transaction and concurrency control 3. Perform indexing and database tuning for a database 4. Demonstrate the use of object relational modeling techniques **Mini Project:** Implement database for a real world application using an appropriate DBMS **Case Study:** Design the relational schema for a given scenario and discuss how database tuning and concurrency control techniques to optimize the performance

EEX5280 Creative Design

Level	5
Course Code	EEX5280
Course Title	Creative Design
Credit value	2
Core/Optional	Optional
Course Aim/s	The aim of this course is to develop ability to understand, contextualize and analyze engineering designs catered to solve an identified problem and communicate to stakeholders
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Explain the principles of design process with respect to the design environment and develop a holistic view. **CLO2**: Carry out a need analysis and a requirement analysis. **CLO3**: Design products to cater the need applying innovative ideas. **CLO4**: Evaluate the proposed design against social, economic and environment impacts.
Content	**Outline Syllabus:** Unit 1: Introduction and Principles of design Unit 2: Design in practice Unit 3: Psychology in design Unit 4: Designing tools and Product Development Unit 5: Evaluation

EEX5376 Embedded Systems and Internet of Things

Level	5
Course Code	EEX5376
Course Title	Embedded Systems and Internet of Things
Credit value	3
Core/Optional	Optional
Course Aim/s	To provide knowledge and skills required to use advanced database and evolving technologies to build secure and efficient optimized software systems
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Understand the vision of IoT from a global context and IoT from market Perspective. **CLO2**: Use of Devices, Gateways, Data Management and Analytics in IoT. **CLO3**: Building state of the art architecture in IoT. **CLO4**: Apply IoT in real world scenarios.
Content	**Outline Syllabus:** Unit 1: IoT vision from a global context and understand devices and gateways Unit 2: IoT data management and analytics Unit 3: IoT architecture **Laboratory work** 1. Building simple IoT system (individual assignment) 2. Design a simple IoT system and understand how different hardware components operate in the IoT system. 3. Build and test hardware components required for the selected simple IoT system. 4. Design and understand how different software components operate in the IoT system. 5. Build and test the software components required for the selected simple IoT system. 6. Integrate all the components and test the simple IoT system. **Group assignment** 1. Come Up with a real world scenario where IoT could add value. 2. Design the IoT solution. 3. Implement the hardware required. 4. Implement the software required. 5. Integrate all the components.

EEX6340 AI Techniques and Agent Technology

Level	6
Course Code	EEX6340
Course Title	AI Techniques and Agent Technology
Credit value	3
Core/Optional	Optional
Course Aim/s	To equip students with concepts of knowledge representation and reasoning in AI and develop solution mechanisms for real world problems using different applications of AI
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Apply suitable knowledge representation mechanism for different scenarios. **CLO2**: Evaluate the applicability of different reasoning mechanisms in a given situation. **CLO3**: Select an appropriate searching method to design an algorithm. **CLO4**: Implement a solution in Prolog to solve a given problem. **CLO5**: Build an expert system for an identified scenario . **CLO6**: Design and implement simple agent based solutions for real world problems.
Content	**Outline Syllabus** Unit 01: Introduction and KRR mechanisms Unit 02: Introduction to AI languages Unit 03: AI Techniques **Laboratory work** 1. Practice to use basics of prolog language for given problems. 2. Demonstrate the use of expert system development tool kits for given scenarios. 3. Demonstrate the use of Agent development tool kits for given scenarios. **Mini Project** Select appropriate AI techniques and tools to solve a given problem

EEX6377 Principles and Applications of Data Mining

Level	6
Course Code	EEX6377
Course Title	Principles and Applications of Data Mining
Credit value	3
Core/Optional	Optional
Course Aim/s	To equip the students with different Data mining algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: Describe and apply basic concepts and techniques of data mining. **CLO2**: Apply different data mining techniques to extract processed information from large amounts of data, both in theory and in practical applications. **CLO3**: Apply the learnt methods with the use of recent data mining software tools for a given scenario/dataset. **CLO4**: Extract and present new information and insights with respect to the analysed scenario/data set.
Content	**Outline Syllabus:** Unit1: Basics of Data Mining Unit2: Data Mining Techniques Unit3: Applications of Data Mining **Laboratory work** 1. Practice to handle data and preprocessing of data 2. Demonstrate the use of data mining algorithms for given data sets 3. Practice mining of real data **Mini Project** Apply learned algorithms and data mining techniques to identify patterns and make predictions for a given real world problem

EEX6278 Neural Networks and Fuzzy Logic

Level	7
Course Code	EEX6278
Course Title	Neural Networks and Fuzzy Logic
Credit value	2
Core/Optional	Optional
Course Aim/s	To be able to apply neural network concepts and fuzzy logic for learning and prediction in intelligent systems.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to: **CLO1**: To create neural networks with suitable learning algorithms and architectures to solve a given problem. **CLO2**: To generate Fuzzy rules in order to create fuzzy interference systems. **CLO3**: To apply neuro-fuzzy systems in Signal processing, communication systems and optimization system.
Content	**Outline Syllabus:** Unit1: Neural Networks Unit2: Fuzzy Logic **Laboratory work** 1. Apply a neural network to a given data set to identify models 2. Learn how to apply fuzzy logic to a given data set **Mini Project** Apply Neural networks and Fuzzy logic in solving a given real world problem