# R.M.K. ENGINEERING COLLEGE

**RSM Nagar, Kavaraipettai – 601 206**

## Department of Electronics and Instrumentation Engineering

**Course Outcomes – ODD Semester 2019-20**

| S.No | Semester | Theory/Practical | Course Code / Course Name |
|---|---|---|---|
| 1 | 3 | Theory | MA8353- Transforms and Partial Differential Equations |
| 2 | 3 | Theory | EC8353- Electronic Devices and Circuits |
| 3 | 3 | Theory | EE8351- Digital Logic Circuits |
| 4 | 3 | Theory | EI8351- Electrical Measurements |
| 5 | 3 | Theory | CS8392- Object Oriented Programming |
| 6 | 3 | Theory | EI8352- Transducers Engineering |
| 7 | 3 | Practical | EI8361- Measurements and Transducers Lab |
| 8 | 3 | Practical | CS8383- Object Oriented Programming Laboratory |
| 9 | 5 | Theory | EI8551- Analytical Instruments |
| 10 | 5 | Theory | EI8552- Industrial Instrumentation - II |
| 11 | 5 | Theory | EI8553- Process Control |
| 12 | 5 | Theory | EE8551- Microprocessors and Microcontrollers |
| 13 | 5 | Theory | EE8591- Digital Signal Processing |
| 14 | 5 | Theory | OCE551- Air Pollution and Control Engineering |
| 15 | 5 | Practical | EI8561- Industrial Instrumentation Laboratory |
| 16 | 5 | Practical | EE8681- Microprocessors and Microcontrollers Laboratory |
| 17 | 7 | Theory | EI6701-Industrial Data Networks |
| 18 | 7 | Theory | EI6702-Logic and Distributed Control System |
| 19 | 7 | Theory | EC6601-VLSI Design |
| 20 | 7 | Theory | EI6703-Fibre Optics and Laser Instruments |
| 21 | 7 | Theory | EI6704-Biomedical Instrumentation |
| 22 | 7 | Theory | EE6008-Microcontroller Based System Design |
| 23 | 7 | Practical | EC6612-VLSI Lab |
| 24 | 7 | Practical | EI6711-Instrumentation System Design Laboratory |
| 25 | 7 | Practical | EI6712-Comprehension |

## THIRD SEMESTER

MA8353- Transforms and Partial Differential Equations

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand how to solve the given standard partial differential equations. |
| **CO2** | Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. |
| **CO3** | Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations. |
| **CO4** | Understand the mathematical principles on Fourier transforms would provide them the ability to formulate and solve some of the physical problems of engineering. |
| **CO5** | Construct z- transform and find inverse z-transform techniques for discrete time systems. |
| **CO6** | Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems. |

EC8353- Electronic Devices and Circuits

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain the structure, characteristics and biasing of various PN junction diodes and its applications. |
| **CO2** | Explain the structure, characteristics and biasing of various types of transistors, thyristors and IGBT. |
| **CO3** | Analyze the BJT amplifier circuits using small signal and high frequency model. |
| **CO4** | Analyze the FET amplifier circuits using small signal and high frequency model. |
| **CO5** | Explain the differential amplifier and types of power amplifier and derive its efficiency. |

EE8351- Digital Logic Circuits

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain the Concept of Number Systems |
| **CO2** | Construct the Combinational Logic Circuits |
| **CO3** | Develop the Synchronous Sequential Circuits |
| **CO4** | Develop the Asynchronous Sequential Circuits |
| **CO5** | Construct the Programmable Logic Devices |
| **CO6** | Develop VHDL programs for Digital Logic Circuits |

EI8351- Electrical Measurements

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Classify the standard devices and galvanometers for the measurement of voltage and current |
| **CO2** | Construct the wattmeter and energy meter to measure power and energy |
| **CO3** | Construct instrumentation transformer to measure high values of current and voltage |
| **CO4** | Analyze the bridges for the measurement of low, medium and high resistance |
| **CO5** | Analyze the bridges for the measurement of inductance and capacitance measurement |
| **CO6** | Construct the potentiometers to measure AC and DC values of unknown voltage |

CS8392- Object Oriented Programming

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Develop Java programs using OOP principles |
| **CO2** | Develop Java programs using the concepts of inheritance and interfaces |
| **CO3** | Build Java applications using exceptions and I/O streams |
| **CO4** | Develop Java applications with threads and generics classes |
| **CO5** | Develop interactive Java programs using swings |
| **CO6** | Develop an application based upon the concepts of Java. |

EI8352- Transducers Engineering

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand how physical quantities are measured and how they are converted to electrical or other forms. |
| **CO2** | Explain the static and dynamic characteristics of transducer, analysis of Zero, First and Second order transducer. |
| **CO3** | Explain the construction and operation of variable resistance transducer. |
| **CO4** | Demonstrate the knowledge of inductance and capacitance transducers. |
| **CO5** | Demonstrate the construction and operation of other transducers and sensors. |
| **CO6** | Understand smart traducer and its standard. |

EI8361- Measurements and Transducers Lab

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand the concepts of measurement, error and uncertainty. |
| **CO2** | Understand the static and dynamic characteristics of measuring instruments. |
| **CO3** | Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance and inductance transducers. |
| **CO4** | Acquire knowledge of analyzing different stages of signal conditioning units. |
| **CO5** | Ability to interpret the results and draw meaningful conclusions. |
| **CO6** | Ability to work as a member of a team while carrying out experiments. |

CS8383- Object Oriented Programming Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Develop and implement Java programs for simple applications that make use of classes, packages and interfaces. |
| **CO2** | Develop and implement Java programs with array list |
| **CO3** | Develop and implement Java programs with exception handling and multithreading. |
| **CO4** | Design applications using file processing and generic programming |
| **CO5** | Design applications using event handling. |

## FIFH SEMESTER

EI8551- Analytical Instruments

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to understand the fundamental principles of selective analytical instruments used in medical diagnosis, quality assurance & control and research studies. |
| **CO2** | Ability to assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance. |
| **CO3** | Ability to critically evaluate the strengths and limitations of the various instrumental methods. |
| **CO4** | Ability to develop critical thinking for interpreting analytical data. |
| **CO5** | Ability to understand the working principle, types and applications of NMR and Mass spectroscopy |
| **CO6** | Illustrate the Microscopic, SEM and TEM techniques. |

EI8552- Industrial Instrumentation - II

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Demonstrate variable head type flow meters |
| **CO2** | Illustrate quantity meters, air flow meters and mass flow meters |
| **CO3** | Explain electrical type flow meters |
| **CO4** | Identify techniques for level measurement |
| **CO5** | Explain various types of transmitters |
| **CO6** | Analyze a suitable instrumentation system for various industries |

EI8553- Process Control

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to understand technical terms and nomenclature associated with Process control domain. |
| **CO2** | Ability to build models using first principles approach as well as analyze models. |
| **CO3** | Ability to understand final control elements |
| **CO4** | Ability to Design, tune and implement PID Controllers to achieve desired performance for various processes |
| **CO5** | Ability to Analyze Systems and design & implement control Schemes for various Processes. |
| **CO6** | Ability to Identify, formulate and solve problems in the Process Control Domain |

EE8551- Microprocessors and Microcontrollers

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Outline the functional blocks of 8085 microprocessor |
| **CO2** | Develop an assembly language program for 8085 microprocessor |
| **CO3** | Explain the architecture of 8051 microcontroller |
| **CO4** | Interpret the interrupt structure of 8085 and 8051 |
| **CO5** | Illustrate how the different peripherals are interfaced with Microprocessor and microcontroller |
| **CO6** | Develop a program for automated system using 8051 |

EE8591- Digital Signal Processing

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Classify the different types of signals and systems |
| **CO2** | Apply z-transform and inverse Z transform in discrete systems |
| **CO3** | Explain the sampling process of continuous time signal. |
| **CO4** | Apply Radix-2 (DIT) and (DIF) FFT Algorithm using Discrete Fourier Transform |
| **CO5** | Compare (IIR) filters and (FIR) filters. |
| **CO6** | Explain various architectures of Digital signal processors |

OCE551- Air Pollution and Control Engineering

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand the atmospheric process and pollutant transport mechanism |
| **CO2** | Apply modelling techniques and to determine the fate of air pollutant with respect to time and space |
| **CO3** | Prevent and control air pollution by suitable air pollution control measures |
| **CO4** | Control and Monitoring of gaseous contaminants in air pollution |
| **CO5** | Prevent, control and measure of Indoor air quality management |

EI8561- Industrial Instrumentation Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to experimentally measure industrial process parameters such as flow and level, |
| **CO2** | Ability to experimentally measure industrial process parameters such as temperature and pressure |
| **CO3** | Ability to experimentally measure industrial process parameters such as viscosity. |
| **CO4** | Ability to measure and analyze pH, conductivity |
| **CO5** | Ability to measure and analyze UV absorbance and transmittance. |
| **CO6** | Ability to measure and analyze physiological parameters such as BP, ECG and pulse rate. |

EE8681- Microprocessors and Microcontrollers Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to understand and apply computing platform and software for engineering problems. |
| **CO2** | Ability to programming logics for code conversion |
| **CO3** | Ability to acquire knowledge on A/D and D/A. |
| **CO4** | Ability to understand basics of serial communication. |
| **CO5** | Ability to understand and impart knowledge in DC and AC motor interfacing. |
| **CO6** | Ability to understand basics of software simulators. |

## SEVENTH SEMESTER

EI6701-Industrial Data Networks

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand basic concepts of data networks |
| **CO2** | Explain basics of inter-networking and serial communications |
| **CO3** | Summarize HART and Field buses |
| **CO4** | Illustrate MODBUS, PROFIBUS and other communication protocol |
| **CO5** | Interpret Industrial Ethernet |
| **CO6** | Explain Wireless communication |

EI6702-Logic and Distributed Control System

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Demonstrate Programmable Logic Controller and various programming languages |
| **CO2** | Outline various instructions in Programmable Logic Controller |
| **CO3** | Develop a logic for various industrial applications using PLC programming language |
| **CO4** | Explain computer control systems |
| **CO5** | Demonstrate Distributed Control Systems |
| **CO6** | Make use of interface techniques in Distributed Control System |

EC6601-VLSI Design

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Examine basic CMOS circuits and properties of CMOS transistors and able to draw stick diagram and layout of CMOS circuits |
| **CO2** | Examine CMOS realization for combinational logic design and analyze the delay models for combinational circuits |
| **CO3** | Evaluate the power dissipation and low power design principles in CMOS circuits. |
| **CO4** | Develop sequential logic circuits and memory architecture and low power memory circuits |
| **CO5** | Construct different architectures for Arithmetic building blocks |
| **CO6** | Develop the techniques of chip design using programmable devices |

EI6703-Fibre Optics and Laser Instruments

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Compare types of Optical fibers, optical sources and Detectors |
| **CO2** | Classify the industrial applications of optical fibers |
| **CO3** | Explain the various types of LASER |
| **CO4** | Relate the industrial applications of LASER |
| **CO5** | Interpret holography techniques |
| **CO6** | Compare the various medical applications of LASER |

EI6704-Biomedical Instrumentation

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain the different physiological systems of human |
| **CO2** | Summarize various electrical and non-electrical parameters measuring devices. |
| **CO3** | Illustrate non electrical parameters measurement methods |
| **CO4** | Classify the various recording methods used in medical field |
| **CO5** | Infer the graphical and imaging applications in biomedical system. |
| **CO6** | Summarize the life assisting and therapeutic devices |

EE6008-Microcontroller Based System Design

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain the architecture of PIC microcontroller |
| **CO2** | Demonstrate use of interrupts and timers |
| **CO3** | Explain on the peripheral devices for data communication and transfer |
| **CO4** | Explain functional blocks of ARM processor |
| **CO5** | Illustrate the architecture of ARM processors |

EC6612-VLSI Lab

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Summarize HDL based design entry |
| **CO2** | Build simple counters, state machines, adders (min 8 bit) and multipliers |
| **CO3** | Develop hardware fusing and testing |
| **CO4** | Experiment with differential amplifier |
| **CO5** | Develop Layout generation |
| **CO6** | Analyse the static timing analysis |

EI6711-Instrumentation System Design Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Analyse Instrumentation amplifier, active filters, regulated power supply, V/I and I/V converters |
| **CO2** | Examine the signal conditioning circuit for Thermocouple, strain gauge and RTD |
| **CO3** | Analyse Control valve, orifice plate and Rotameter. |
| **CO4** | Inspect PID controller |
| **CO5** | Summarize P & ID for industrial process |
| **CO6** | Illustrate Programmable Logic Controller for digital logic gates |

EI6712-Comprehension

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain Engineering fundamentals |
| **CO2** | Apply mathematics to engineering problem |
| **CO3** | Apply Engineering fundamentals to complex circuits |
| **CO4** | Take part in discussion as a leader in diverse teams |
| **CO5** | Extend knowledge on communication and presentation skills |
| **CO6** | Develop managerial skills to establish start ups |

**Course Outcomes – EVEN Semester 2019-20**

| S.No | Semester | Theory/Practical | Course Code / Course Name |
|---|---|---|---|
| 1. | 4 | Theory | MA8491- Numerical Methods |
| 2. | 4 | Theory | EI8451- Electrical Machines |
| 3. | 4 | Theory | EI8452- Industrial Instrumentation - I |
| 4. | 4 | Theory | EE8451- Linear Integrated Circuits and Applications |
| 5. | 4 | Theory | IC8451- Control Systems |
| 6. | 4 | Theory | EC8395- Communication Engineering |
| 7. | 4 | Practical | EI8461- Devices and Machines Laboratory |
| 8. | 4 | Practical | EE8461- Linear and Digital Integrated Circuits Laboratory |
| 9. | 6 | Theory | EI8651-Logic and Distributed Control System |
| 10. | 6 | Theory | EI8691-Computer Control of Processes |
| 11. | 6 | Theory | CS8391-Data Structures |
| 12. | 6 | Theory | EI8692-Electronic Instrumentation |
| 13. | 6 | Theory | EI8077-Power Electronics and Drives |
| 14. | 6 | Theory | EI8072-Advanced Instrumentation Systems |
| 15. | 6 | Practical | CS8381-Data Structures Laboratory |
| 16. | 6 | Practical | EI8661-Process Control Laboratory |
| 17. | 6 | Practical | HS8581-Professional Communication |
| 18. | 8 | Theory | MG6851- Principles of Management |
| 19. | 8 | Theory | EI6801- Computer Control of Processes |
| 20. | 8 | Theory | GE6757- Total Quality Management |
| 21. | 8 | Practical | EI6811- Project Work |

## FOURTH SEMESTER

MA8491- Numerical Methods

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Apply the concepts of algebraic and transcendental equations |
| **CO2** | Evaluate the eigenvalues of a matrix numerically |
| **CO3** | Construct an approximate interpolating polynomials for equal and unequal intervals. |
| **CO4** | Apply the numerical techniques of differentiation and integration for engineering problems. |
| **CO5** | Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. |
| **CO6** | Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications. |

EI8451- Electrical Machines

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand the working principles of DC machines as Generator and Motor, types, determination of their no-load/load characteristics, starting and methods of speed control of motors. |
| **CO2** | Acquire the basic knowledge of construction, working and operation of transformer |
| **CO3** | Analyse the construction and working of Synchronous machines |
| **CO4** | Understand the construction working starting and speed control of three phase induction motor |
| **CO5** | Understand the principle of operation of Single Induction machines |

EI8452- Industrial Instrumentation – I

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Introduce the measurement techniques of force, torque and speed |
| **CO2** | Introduce the measurement techniques of acceleration, Vibration and density |
| **CO3** | Introduce the measurement techniques of Viscosity, Humidity and moisture. |
| **CO4** | Introduce the temperature measurement techniques |
| **CO5** | Introduce the pressure measurement techniques |

EE8451- Linear Integrated Circuits and Applications

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Outline the fabrication process of IC |
| **CO2** | Illustrate the ideal and non ideal characteristics of op-amp |
| **CO3** | Explain various applications of op-amp. |
| **CO4** | Design the different types of oscillators and ADC,DAC |
| **CO5** | Illustrate various application ICs |
| **CO6** | Explain the working of special function ICs. |

IC8451- Control Systems

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Analyze electromechanical systems by mathematical modeling. |
| **CO2** | Illustrate the time response of first and second order systems using standard test signals |
| **CO3** | Examine the frequency-domain response of closed loop system |
| **CO4** | Identify a compensator system satisfying requirements |
| **CO5** | Develop system equations in state-variable form (state variable models) |
| **CO6** | Analyze a control theory applications to AC motors |

EC8395- Communication Engineering

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Identify and Understand analog communication techniques |
| **CO2** | Discuss about pulse modulation techniques. |
| **CO3** | Identify and Understand digital communication techniques |
| **CO4** | Understand the various source coding techniques and apply the suitable error control codes |
| **CO5** | Understand about spread spectrum techniques. |
| **CO6** | Understand about Multiple access techniques. |

EI8461- Devices and Machines Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Gain knowledge on the proper usage of various electronic equipment and simulation tools for design and analysis of electronic circuits. |
| **CO2** | Get hands-on experience in studying the characteristics of semiconductor devices. |
| **CO3** | Ability to analyze various electronic circuits such as voltage regulators, transistor amplifiers and oscillators. |
| **CO4** | Ability to make use of basic concepts to obtain the no load and load characteristics of D.C machines. |
| **CO5** | Analyze and draw conclusion from the characteristics obtained by conducting experiments on machines. |
| **CO6** | Ability to carry out the Experiments in batches to motivate the Team work. |

EE8461- Linear and Digital Integrated Circuits Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to understand and implement Boolean Functions. |
| **CO2** | Ability to understand the importance of code conversion |
| **CO3** | Ability to Design and implement 4-bit shift registers. |
| **CO4** | Ability to acquire knowledge on Application of Op-Amp |
| **CO5** | Ability to Design and implement counters using specific counter IC |

## SIXTH SEMESTER

EI8651-Logic and Distributed Control System

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand all the important components of PLC and SCADA, I/O modules and field devices of an industrial automation system. |
| **CO2** | Develop PLC program in using ladder diagram for industrial sequential applications. |
| **CO3** | Develop PLC program in using other languages for industrial sequential applications. |
| **CO4** | Understand all the important components of DCS and Smart field devices of an industrial automation system. |
| **CO5** | Explain the most appropriate automation technologies for a given application. |
| **CO6** | Outline the recent developments in industrial automation. |

EI8691-Computer Control of Processes

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to analyze the discrete time systems |
| **CO2** | Ability to build models from input-output data |
| **CO3** | Ability to design a digital controller |
| **CO4** | Ability to design multi-loop controller and multivariable controller for multi-variable systems. |
| **CO5** | Illustrate the multi-loop regulatory control techniques |
| **CO6** | Explain the different types of multivariable regulatory controllers |

CS8391-Data Structures

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Implement abstract data types using arrays and linked list. |
| **CO2** | Apply the different linear data structures like stack and queue to various computing problems. |
| **CO3** | Implement different types of trees and apply them to problem solutions. |
| **CO4** | Discuss graph structure and understand various operations on graphs and their applicability. |
| **CO5** | Analyze the various sorting and searching algorithms. |
| **CO6** | Understand the hashing technique and hash functions. |

EI8692-Electronic Instrumentation

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Demonstrate various electronic instruments for measurement of voltage |
| **CO2** | Illustrate various types of cathode ray oscilloscopes and their applications |
| **CO3** | Summarize different types of signal analysers |
| **CO4** | Explain different types of waveform generators |
| **CO5** | Examine a measurement system using VI programming techniques |
| **CO6** | Apply different types of modulation and multiplexing techniques in telemetry |

EI8077-Power Electronics and Drives

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Summarize the Switching concepts of power devices |
| **CO2** | Analyze Controlled Rectifiers and AC Controllers |
| **CO3** | Analyze DC to DC Converters and its Applications |
| **CO4** | Analyze the classification of Inverters |
| **CO5** | Apply Converters in Drives and Control |

EI8072-Advanced Instrumentation Systems

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Understand the instrumentation behind flow, level, temperature and pressure measurement |
| **CO2** | Acquire basic knowledge on the various types of analyzers used in typical industries. |
| **CO3** | Understand the role of Safety instrumented system in the industry. |
| **CO4** | Explain Standards for applying Instrumentation in Hazards Locations. |
| **CO5** | Design, develop, and interpret the documents used to define instruments and control Systems for a typical project, including P&IDs, loop diagrams, specification forms, Instrument lists, logic diagrams, installation details, and location plans |

CS8381-Data Structures Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Write functions to implement linear and non-linear data structure operations |
| **CO2** | Suggest appropriate linear / non-linear data structure operations for solving a given problem |
| **CO3** | Appropriately use the linear / non-linear data structure operations for a given problem |
| **CO4** | Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval |

EI8661-Process Control Laboratory

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Ability to understand and analyze process control engineering problems. |
| **CO2** | Be able to build dynamic models using input – output data of a process |
| **CO3** | Ability to working with real time control loops(flow/level/temperature/pressure) |
| **CO4** | Get exposed to simulation tools such as MATLAB/LABVIEW/ASPEN |
| **CO5** | Ability to learn and implement simple adaptive and model based control schemes |

HS8581-Professional Communication

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Make effective presentations |
| **CO2** | Participate confidently in Group Discussions |
| **CO3** | Attend job interviews and be successful in them |
| **CO4** | Develop adequate Soft Skills required for the workplace |
| **CO5** | Enhance the Employability and Career Skills |

## EIGHTH SEMESTER

MG6851- Principles of Management

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explaining the basic principles, concepts, evolution of Management thinking, the role of managers and different types of organization. |
| **CO2** | Apply knowledge on Planning tools and techniques |
| **CO3** | Discuss the stages in decision making process and explain the types of strategies in order to make rational decisions |
| **CO4** | Illustrate the concepts of controlling and organizing of an organization. |
| **CO5** | Assess and compare different leadership styles and select appropriate style for an organization |
| **CO6** | Compile and demonstrate effective communication and explain various theories of motivation, innovation and creativity |

EI6801- Computer Control of Processes

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Construct the discrete time systems in state variable form |
| **CO2** | Explain the system identification techniques |
| **CO3** | Make use of different types of algorithms for the design of direct discrete system |
| **CO4** | Explain the concept of Digital Feed forward Controllers, Internal Model Control and LQG Control |
| **CO5** | Illustrate the multi-loop regulatory control techniques |
| **CO6** | Explain the different types of multivariable regulatory controllers |

GE6757- Total Quality Management

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Explain the customer care management systems |
| **CO2** | Apply the leadership qualities in management |
| **CO3** | Explain the Benchmark in manufacturing system |
| **CO4** | Execute the Quality Management principles using six sigma |
| **CO5** | Explain the ISO Auditing system |

EI6811- Project Work

| COs | Course Outcome: The students, after the completion of the course, are expected to …. |
|---|---|
| **CO1** | Demonstrate a sound technical knowledge of their selected project topic |
| **CO2** | Identify the problem, formulation and solution |
| **CO3** | Design engineering solutions to complex problems utilizing a systems approach |
| **CO4** | Develop an engineering project |
| **CO5** | Demonstrate the knowledge, skills and attitudes of a professional engineer |
| **CO6** | Improve the managerial skills to meet the industry |