

JAYA ENGINEERING COLLEGE
THIRUNINRAVUR
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

REGULATION - 2017
COURSE OUTCOMES (CO)

SEMESTER	SUB. CODE	SUB.NAME	COURSE OUTCOMES
1	HS8151	COMMUNICATIVE ENGLISH	CO1. Understand how to solve the given standard partial differential equations.
			CO2. Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
			CO3. Comprehend conversations and short talks delivered in English
			CO4. Write short essays of a general kind and personal letters and emails in English.
1	MA8151	ENGINEERING MATHEMATICS – I	CO1. Use both the limit definition and rules of differentiation to differentiate functions.
			CO2. Apply differentiation to solve maxima and minima problems.
			CO3. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus
			CO4. Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
			CO5. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
			CO6. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
			CO7. Apply various techniques in solving differential equations.
1	PH8151	ENGINEERING PHYSICS	CO 1: The students will gain knowledge on the basics of properties of matter and its applications,
			CO 2: The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
			CO 3: the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
			CO 4: The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and the students will understand the basics of crystals, their structures and different crystal growth techniques.
1	CY8151	ENGINEERING CHEMISTRY	CO1. The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
1	PH8151	PROBLEM SOLVING AND PYTHON PROGRAMMING	CO 1: Develop algorithmic solutions to simple computational problems
			CO 2: Read, write, execute by hand simple Python programs.
			CO 3: Structure simple Python programs for solving problems.
			CO 4: Decompose a Python program into functions.
			CO 5: Represent compound data using Python lists, tuples, and dictionaries.
			CO 6: Read and write data from/to files in Python Programs
1	GE8152	ENGINEERING GRAPHICS	CO 1: Familiarize with the fundamentals and standards of Engineering graphics
			CO 2: Perform freehand sketching of basic geometrical constructions and multiple views of objects.
			CO 3: Project orthographic projections of lines and plane surfaces.
			CO 4: Draw projections and solids and development of surfaces.
			CO 5: Visualize and to project isometric and perspective sections of simple solids.
1	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	CO 1: Write, test, and debug simple Python programs.
			CO 2 : Implement Python programs with conditionals and loops.
			CO 3: Develop Python programs step-wise by defining functions and calling them.
			CO 4: Use Python lists, tuples, dictionaries for representing compound data.
			CO 5: Read and write data from/to files in Python.
1	BS8161	PHYSICS AND CHEMISTRY	CO 1 : Apply principles of elasticity, optics and thermal properties for engineering applications.

		LABORATORY	CO 2 : The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters
2	HS8251	TECHNICAL ENGLISH	CO 1: Read technical texts and write area- specific texts effortlessly.
			CO 2 : Listen and comprehend lectures and talks in their area of specialisation successfully.
			CO 3: Speak appropriately and effectively in varied formal and informal contexts.
			CO 4: Write reports and winning job applications.
2	MA8251	ENGINEERING MATHEMATICS – II	CO 1: Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
			CO 2: Gradient, divergence and curl of a vector point function and related identities.
			CO 3: Evaluation of line, surface and volume integrals using Gauss, Stokes and Green’s theorems and their verification.
			CO 4: Analytic functions, conformal mapping and complex integration.
2	PH8253	PHYSICS FOR ELECTRONICS ENGINEERING	CO 5: Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
			CO1. Gain knowledge on classical and quantum electron theories, and energy band structures,
			CO2. Acquire knowledge on basics of semiconductor physics and its applications in various devices,
			CO3. Get knowledge on magnetic and dielectric properties of materials,
2	BE8252	BASIC CIVIL AND MECHANICAL ENGINEERING	CO4. Have the necessary understanding on the functioning of optical materials for optoelectronics,
			CO5. Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
			CO1. Appreciate the Civil and Mechanical Engineering components of Projects.
			CO2. Explain the usage of construction material and proper selection of construction materials.
			CO3. Measure distances and area by surveying.
			CO4. Identify the components used in power plant cycle.
2	EE8251	CIRCUIT THEORY	CO5.Demonstrate working principles of petrol and diesel engine.
			CO6. Elaborate the components of refrigeration and Air conditioning cycle
			CO1. Ability to analyse electrical circuits
2	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING	CO2. Ability to apply circuit theorems
			CO3. Ability to analyse transients
			CO1.Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
			CO2. Public awareness of environmental is at infant stage.
2	GE8261	ENGINEERING PRACTICES LABORATORY	CO3. Ignorance and incomplete knowledge has lead to misconceptions
			CO4. Development and improvement in std. of living has lead to serious environmental disasters
			CO 1: Fabricate carpentry components and pipe connections including plumbing works.
			CO 2 : Use welding equipments to join the structures.
			CO 3: Carry out the basic machining operations
			CO 4: Make the models using sheet metal works
			CO 5: Illustrate on centrifugal pump, air conditioner, operations of smithy, foundry and fittings
			CO 6: Carry out basic home electrical works and appliances
2	EE8261	ELECTRIC CIRCUITS LABORATORY	CO 7: Measure the electrical quantities
			CO 8 Elaborate on the components, gates, soldering practices.
3	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1. Understand and apply circuit theorems and concepts in engineering applications.
			CO2. Simulate electric circuits.
			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.
3	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL 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.
3	EC8353	ELECTRON DEVICES AND CIRCUITS	CO1. Explain the structure and working operation of basic electronic devices. CO2.Able to identify and differentiate both active and passive elements CO3. Analyze the characteristics of different electronic devices such as diodes and transistors CO4. Choose and adapt the required components to construct an amplifier circuit. CO5.Employ the acquired knowledge in design and analysis of oscillators.
3	EE8351	DIGITAL LOGIC CIRCUITS	CO1.Ability to design combinational and sequential Circuits. CO2.Ability to simulate using software package. CO3. Ability to study various number systems and simplify the logical expressions using Boolean functions CO4. Ability to design various synchronous and asynchronous circuits. CO5.Ability to introduce asynchronous sequential circuits and PLDs CO6.Ability to introduce digital simulation for development of application oriented logic circuits.
3	EI8351	ELECTRICAL MEASUREMENTS	CO1.Ability to measure current and voltage, CO2.Ability to understand AC and DC measurements. CO3. Ability to measure power and calibration of energy meters. CO4. Ability to measure current and voltage using potentiometric method. CO5.Ability to understand the resistance measurement CO6.Ability to use bridge circuit to measure resistance, inductance and capacitance.
3	EI8352	TRANSDUCERS ENGINEERING	CO1.Ability to apply the mathematical knowledge and science & engineering fundamentals gained to solve problems pertaining to measurement applications. CO2.Ability to analyze the problems related to sensors & transducers. CO3. Ability to measure power and calibration of energy meters. CO4.Ability to determine the static and dynamic characteristics of transducers using software packages. CO5.Ability to understand fiber optic sensor and applications CO6.Ability to understand smart traducer and its standard.
3	CS8392	OBJECT ORIENTED PROGRAMMING	CO1.Develop Java programs using OOP principles CO2.Develop Java programs with the concepts 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
3	EI8361	MEASUREMENTS AND TRANSDUCERS LABORATORY	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.
3	CS8383	OBJECT ORIENTED PROGRAMMING LABORATORY	CO1.Develop and implement Java programs for simple applications that make use of classes, packages and interfaces. CO2.Develop and implement Java programs with arraylist, exception handling and multithreading . CO3.Design applications using file processing, generic programming and event handling.
4	MA8491	NUMERICAL METHODS	CO1. Understand the basic concepts and techniques of solving algebraic and transcendental equations. CO2.Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situation CO3. Apply the numerical techniques of differentiation and integration for engineering problems. CO4. Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. CO5. Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

4	EI8451	ELECTRICAL MACHINES	CO1. Ability to acquire knowledge to solve problems associated with DC and AC Machines.
			CO2.Ability to test and control different machines based on the familiarity of basic concepts and working principle.
			CO3. Ability to choose appropriate machines for a given application while carrying out projects.
			CO4. Ability to apply the knowledge gained to choose appropriate machines for specific application useful for the society.
			CO5.Ability to know about the latest developments related to machines and to learn their concepts even after the completion of the course.
			CO6.Ability to acquire knowledge of stepper motor.
4	EI8452	INDUSTRIAL INSTRUMENTATION - I	CO1.Ability to understand the construction and working of instruments used for measurement of force, torque, speed, acceleration, vibration, density, viscosity, humidity, moisture, temperature.
			CO2.Ability to select instruments according to the application.
			CO3. Ability to understand the concept of calibration of instruments and gain knowledge about temperature measurement devices.
			CO4. Ability to design signal conditioning circuits and compensation schemes for temperature measuring instruments.
			CO5.Ability to understand the working of instruments used for measurement of pressure.
			CO6.Ability to measure fiber optic sensor to measure temperature.
4	EE8451	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	CO1.Ability to acquire knowledge in IC fabrication procedure
			CO2.Ability to analyze the characteristics of Op-Amp
			CO3. To understand the importance of Signal analysis using Op-amp based circuits.
			CO4. Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.
			CO5.To understand and acquire knowledge on the Applications of Op-amp
			CO6.Ability to understand and analyse, linear integrated circuits their Fabrication and Application.
4	IC8451	CONTROL SYSTEMS	CO1.Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
			CO2.Apply analog and digital communication techniques.
			CO3. Use data and pulse communication techniques.
			CO4.Analyze Source and Error control coding.
4	EC8395	COMMUNICATION ENGINEERING	CO1.Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
			CO2.Develop Java programs with the concepts 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
4	EI8461	DEVICES AND MACHINES LABORATORY	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.
4	EE8461	LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY	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.
5	EI8551	ANALYTICAL INSTRUMENTS	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.

5	EI8552	INDUSTRIAL INSTRUMENTATION - II	CO1. Ability to understand the construction, installation and working of different variable head type flow meters.
			CO2.Ability to build models using first principles approach as well as analyze models.
			CO3. Ability to gain knowledge about the construction, working and calibration of different type of transmitters.
			CO4. Ability to choose appropriate flow meters or level sensor for an application.
5	EI8553	PROCESS CONTROL	CO1.Ability to understand technical terms and nomenclature associated with Process control domain.
			CO2.Ability to select instruments according to the application.
			CO3. Ability to Design, tune and implement PID Controllers to achieve desired performance for various processes
			CO4. Ability to Analyze Systems and design & implement control Schemes for various Processes.
			CO5.Ability to Identify, formulate and solve problems in the Process Control Domain.
5	EE8551	MICROPROCESSORS AND MICROCONTROLLERS	CO1.Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.
			CO2.Ability to need & use of Interrupt structure 8085 & 8051.
			CO3. Ability to understand the importance of Interfacing
			CO4. Ability to explain the architecture of Microprocessor and Microcontroller.
			CO5.Ability to write the assembly language programme.
			CO6.Ability to develop the Microprocessor and Microcontroller based applications.
5	EE8591	DIGITAL SIGNAL PROCESSING	CO1.Ability to understand the importance of Fourier transform, digital filters and DS Processors.
			CO2.Ability to acquire knowledge on Signals and systems & their mathematical representation.
			CO3. Ability to understand and analyze the discrete time systems.
			CO4.Ability to analyze the transformation techniques & their computation.
			CO5. Ability to understand the types of filters and their design for digital implementation.
			CO6.Ability to acquire knowledge on programmability digital signal processor & quantization effects
5	OCE551	AIR POLLUTION AND CONTROL ENGINEERING	CO1.An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management.
			CO2.Ability to identify, formulate and solve air and noise pollution problems.
			CO3. Ability to design stacks and particulate air pollution control devices to meet applicable standards.
			CO4.Ability to select control equipments.
			CO5.Ability to ensure quality, control and preventive measures.
5	EI8561	INDUSTRIAL INSTRUMENTATION LABORATORY	CO1.Ability to experimentally measure industrial process parameters such as flow, level, temperature, pressure and viscosity.
			CO2.Ability to measure and analyze pH, conductivity, UV absorbance and transmittance
			CO3. Ability to measure and analyze physiological parameters such as BP, ECG and pulse rate.
5	EE8681	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	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.
6	EI8651	LOGIC AND DISTRIBUTED CONTROL SYSTEM	CO1.Ability to understand all the important components such as PLC, SCADA, DCS,I/O modules and field devices of an industrial automation system.
			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.Able to select and use most appropriate automation technologies for a given application.
			CO4.Ability to gain knowledge on the recent developments in industrial automation.
6	EI8691	COMPUTER CONTROL OF PROCESSES	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
6	CS8391	DATA STRUCTURES	CO1.Implement abstract data types for linear data structures.
			CO2.Apply the different linear and non-linear data structures to problem solutions.
			CO3. Critically analyze the various sorting algorithms.
6	EI8692	ELECTRONIC INSTRUMENTATION	CO1.Ability to understand and analyze Instrumentation systems and their applications to various industries.

6	EI8074	COMPUTER NETWORKS	CO1. Identify the components required to build different types of networks
			CO2. Choose the required functionality at each layer for given application
			CO3. Identify solution for each functionality at each layer
			CO4. Trace the flow of information from one node to another node in the network.
			CO5. Identify the congestion control and Avoidance
			CO6. Learn the tradition applications and web services
6	EE8071	APPLIED SOFT COMPUTING	CO1. Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.
			CO2. To understand and apply computing platform and software for engineering problems.
6	CS8381	DATA STRUCTURES LABORATORY	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
6	EI8661	PROCESS CONTROL LABORATORY	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
6	HS8581	PROFESSIONAL COMMUNICATION	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
7	EI8751	INDUSTRIAL DATA NETWORKS	CO1. Ability to define basic concepts of data communication and its importance.
			CO2. Ability to explain the various internetworking devices involved in industrial networks
			CO3. Ability to explain the various serial communication used in process industries.
			CO4. Ability to illustrate, compare & explain the working of HART and Field bus used in process digital communication.
			CO5. Ability to summarize the operation of MODBUS, PROFIBUS protocol & its applications.
			CO6. Ability to explain and adopt the different Industrial Ethernet protocol and usage of wireless communication in process applications.
7	EE8691	EMBEDDED SYSTEMS	CO1. Ability to understand and analyze Embedded systems.
			CO2. Ability to suggest an embedded system for a given application.
			CO3. Ability to operate various Embedded Development Strategies
			CO4. Ability to study about the bus Communication in processors.
			CO5. Ability to acquire knowledge on various processor scheduling algorithms.
			CO6. Ability to understand basics of Real time operating system.
7	EC8093	DIGITAL IMAGE PROCESSING	CO1. Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
			CO2. Operate on images using the techniques of smoothing, sharpening and enhancement.
			CO3. Understand the restoration concepts and filtering techniques.
			CO4. Learn the basics of segmentation, features extraction, compression and recognition methods for color models.
7	EI8075	FIBRE OPTICS AND LASER INSTRUMENTS	CO1. Understand the principle, transmission, dispersion and attenuation characteristics of optical fibers
			CO2. Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications.
			CO3. Understand laser theory and laser generation system.
			CO4. Students will gain ability to apply laser theory for the selection of lasers for a specific Industrial and medical application.
7	GE8077	TOTAL QUALITY MANAGEMENT	CO1. The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
7	OME754	INDUSTRIAL SAFETY	CO1. Students must be able to identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management.
7	EI8761	f	CO1. Ability to understand and Programming of PLC, SCADA and DCS
			CO2. Ability to working with industrial automation system

			CO3. Be able to design and implement control schemes in PLC & DCS
			CO4. Ability to interface field devices with PLC & DCS
7	EI8762	INSTRUMENTATION SYSTEM DESIGN LABORATORY	CO1.Ability to understand design of signal conditioning circuits and instrumentation systems.
			CO2.Ability to design controller, control valve and transmitter.
			CO3. Be able to design and draw the piping diagram for industrial application projects.
			CO4. Be able to design the multi-channel data acquisition system and transmitter.
8	EI8073	BIOMEDICAL INSTRUMENTATION	CO1.Ability to understand the philosophy of the heart, lung, blood circulation and respiration system.
			CO2. Ability to provide latest ideas on devices of non-electrical devices.
			CO3.Ability to gain knowledge on various sensing and measurement devices of electrical origin.
			CO4.Ability to understand the analysis systems of various organ types
			CO5. Ability to bring out the important and modern methods of imaging techniques and their analysis.
			CO6. Ability to explain the medical assistance/techniques, robotic and therapeutic equipments.
8	EI8079	ROBOTICS AND AUTOMATION	CO1.Understand the evolution of robot technology and mathematically represent different types of robot..
			CO2. Get exposed to the case studies and design of robot machine interface.
			CO3.Familiarize various control schemes of Robotics control.
8	EI8811	PROJECT WORK	CO1.On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology