DON BOSCO INSTITUTE OF TECHNOLOGY, MUMBAI
DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION
COURSE OUTCOMES

CAY- (Even semester, 2021-22)

Course Name:	Maths IV		
Course Code	ECC401		
Faculty Name:	Mr. SataNarayan		
Year	2	Sem	IV

CO Number	Course Outcome
ECC401.1	Students will be able to (i) Obtain Eigen values and Eigen vectors for a given square matrix (ii) Define Metric spaces (iii) Define Karl Pearson's correlation coefficient and Spearman's rank correlation coefficient
ECC401.2	Students will be able to (i) Infer properties of Eigen values and Eigen vectors (ii) Show if a given set is a vector space or not (iii) Interpret if a given distance / set is a metric / metric space (iv) Calculate conditional Probabilities using Bayes' theorem (v) Obtain pdf and cdf of discrete and continuous random variables (including special discrete – Binomial and Poisson and special continuous – normal) (vi) Calculate various probabilities of random variables following Binomial Poisson and Normal distributions (vii) Karl-Pearson's Coefficient of Correlation and Spearman's Rank Correlation and regression lines
ECC401.3	Students will be able to (i) Construct diagonal matrices using the concept of similarity (ii) Build functions of square matrices (iii) Obtain normal and orthogonal forms of Quadratic forms (iv) Obtain extremals of a given integral using the theory of Calculus of variations (v) Evaluate integrals using the different Cauchy's theorems (Integral theorem, Residue theorem) (vi) Obtain Taylor's and Laurent's series (vii) Identify orthogonal vectors and obtain orthonormal basis using Gram-Schmidt process (viii) Use Bayes' theorem to obtain conditional probabilities (x) Obtain MGF and hence obtain the mean and variance (up to first 4 moments) of a random variableObtain probabilities using correct interpretation of Binomial distribution, Poisson and normal approximations to binomial distribution and also Binomial approximation to normal distribution
ECC401.4	Students will be able to (i) Obtain extremals of a given integral under some constraints using the theory of Calculus of variations (Isoperimetric problems) (ii) Obtain probabilities and z-values for normal distributions

Course Name:	Micro Controller		
Course Code	ECC-402		
Faculty Name:	Prof. Jithin Isacc		
Year	2	Sem	IV

CO Number	Course Outcome
ECC402.01	Student will know basic features, architecture and pin configuration of 8051 and ARM7 microcontroller.
ECC402.02	Student will be able to demonstrate understanding of memory organization, Instruction set, addressing modes, I/O ports, counter/ timer, Interrupts, UART of 8051 and ARM7 microcontroller.
ECC402.03	Student will be able to apply knowledge of instruction set to write assembly language program for given logic.
ECC402.04	Student will be able to interface and program peripheral devices LED, LCD, and seven segment displays, Keyboard, ADC and DAC (0808/09), Stepper motor and relay, IR sensor with 8051 and ARM7 microcontroller.
ECC402.05	Students will analyse input/output interface and demonstrate knowledge via simulation.
ECC402.06	Student will be able to design microcontroller based system for various application

Course Name:	Linear Integrated Circuits		
Course Code	ECC403		
Faculty Name:	Dr. S S Mande		
Year	2	Sem	IV

CO Number	Course Outcome
ECC403.1	The student will be able to understand the fundamentals and areas of applications for the linear integrated circuits.
ECC403.2	The students will be able to identify the concepts to a particular circuit to build a given application in linear integrated circuits
ECC403.3	The student will be able to analyze important types of linear integrated circuits of day-to-day requirements.
ECC403.4	The student will be able to evaluate various parameters for any given linear integrated circuits
ECC403.5	The students will be able to apply the concepts to a particular circuit to build a given application in linear integrated circuits
ECC403.6	The students will be able to design a circuit for any particular applications in the area of linear integrated circuit.

Course Name:	SS		
Course Code	ECC404		
Faculty Name:	Satish Chavan		
Year	2	Sem	IV

CO Number	Course Outcome
ECC404.1	Students will be able to learn the mathematical description and representation of continuous and discrete time signals and systems.
ECC404.2	Students will be able to interpret & classify signals & systems based on their different properties.
ECC404.3	Students will be able to apply the Laplace transform and Z- transform to continuous-time and discrete-time signals and determine the response of LTI system using convolution.
ECC404.4	Students will be able to Analyse the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.
ECC404.5	Students will be able to compare & evaluate the different signal processing algorithms being used for various signal processing applications.
ECC404.6	Students will be able to realize and design recursive and non recursive systems in different forms.

Course Name:	Principles of Communication Engineering
Course Code	ECC405
Faculty Name:	Mrs. Namita Agarwal
Year	2	Sem	IV

CO Number	Course Outcome
ECC405.1	The students will be able to describe the basic components, types of noises and principles of multiplexing techniques in a communication system.
ECC405.2	The students will be able to discuss the different types of modulation and demodulation techniques for analog communication.
ECC405.3	The students will be able to apply their knowledge in obtaining the different performance parameters of a communication system.
ECC405.4	The students will be able to analyze the concepts of Amplitude and Frequency Modulation and Demodulation systems.
ECC405.5	The students will be able to evaluate and compare analog comunication, pulse modulation and multiplexing techniques.
ECC405.6	The students will be able to explore the applications of different modulation techniques and present their work.

Course Name	Principles of Communication Engineering Laboratory
Course Code	ECL403
Faculty Name:	Mrs. Namita Agarwal
Year	2	Sem	IV

CO Number	Course Outcome
ECL403.1	The students will be able to experimentally demonstrate and explain the analog modulation techniques.
ECL403.2	The students will be able to experimentally implement and perform analog and pulse modulation techniques.
ECL403.3	The students will be able to find the different physical parameters of the various modulated signals.
ECL403.4	The students will be able to analyze the waveforms of various types of analog and pulse modulation methods.
ECL403.5	The students will be able to simulate and compare the different modulation techniques

Course Name:	LIC LAB		
Course Code	ECL402		
Faculty Name:	Dr. Mande		
Year	2	Sem	IV

CO Number	Course Outcome
ECL402.1	The students will understand the working of various IC , timers and linear integrated circuits
ECL402.2	The students will be able to identify the particular circuit necessary to perform a particular operation
ECL402.3	The students will be able to analyze the working of differerent types of circuits
ECL402.4	The students will be able to evaluate various parameters of the given circuit.
ECL402.5	The students will be able to apply the concepts of the numerous ICs they learn in practical circuits
ECL402.6	The students will be able to design the circuit for a given application

Course Name:	MC LAB		
Course Code	ECL401		
Faculty Name:	Prof Jithin Isacc		
Year	2	Sem	IV

CO Number	Course Outcome
ECL401.1	Student will know basic features, architecture and pin configuration of 8051 and ARM7 microcontroller.
ECL401.2	Student will be able to demonstrate understanding of memory organization, Instruction set, addressing modes, I/O ports, counter/ timer, Interrupts, UART of 8051 and ARM7 microcontroller.
ECL401.3	Student will be able to apply knowledge of instruction set to write assembly language program for given logic.
ECL401.4	Student will be able to interface and program peripheral devices LED, LCD, and seven segment displays, Keyboard, ADC and DAC (0808/09), Stepper motor and relay, IR sensor with 8051 and ARM7 microcontroller.
ECL401.5	Students will analyse input/output interface and demonstrate knowledge via simulation.
ECL401.6	Student will be able to design microcontroller based system for various application

Course Name:	Skill Lab: Python Programming	
Course Code	ECL404	
Faculty Name:	Prof. Poonam Chakraborty	
Year	2	**Sem**	IV

CO Number	Course Outcome
ECL401.1	Students will be able to Describe syntax and semantics in Python
ECL401.2	Students will be able to Illustrate different file handling operations
ECL401.3	Students will be able to Interpret object oriented programming in Python
ECL401.4	Students will be able to Design GUI Applications in Python
ECL401.5	Students will be able to Express proficiency in the handling Python libraries for data science
ECL401.6	Students will be able to Develop machine learning applications using Python

Course Name:	Mini Project 1B	
Course Code	ECM401	
Faculty Name:	Mr. Jithin Isaac, Ms. Aparna Telgote, Freda C.	
Year	2	**Sem**	IV

CO Number	Course Outcome
ECL401.1	Students will be able to Write basic codes for the Arduino board using the IDE for utilizing the onboard resources
ECL401.2	Students will be able to Write code using python language using IDE for utilizing the onboard resources.
ECL401.3	Students will be able to Apply the knowledge of interfacing different devices to the Arduino board to accomplish a given task.
ECL401.4	Students will be able to Apply the knowledge of interfacing different devices to raspberry Pi board to accomplish a given task.
ECL401.5	Students will be able to Design Arduino based projects for a given problem
ECL401.6	Students will be able to Design Raspberry Pi based projects for a given problem.

Course Name:	Electromagnetics and Antenna		
Course Code	ECC601		
Faculty Name:	Dr. Ashwini Kotrashetti		
Year	3	Sem	VI

CO Number	Course Outcome
ECC601.1	Student will be able to define and explain Maxwell's equations, various antenna parameters , different propagation effects.
ECC601.2	Student will be able to use Maxwell's equations for derivations of various antennas. They will be able to solve problems on antenna fundamentals
ECC601.3	Student will be able to apply concepts to compare various types of antennas based on the requirements /applications. They will be able to evaluate polarisation, impedance matching effects in antennas.
ECC601.4	Student will be able to analyse the radiation pattern, beamwidth, directivity, null directions for antenna array, yagi and log periodic antenna
ECC601.5	Student will be able to evaluate the given specifications to arrive at the appropriate design/circuit considerations of antennas
ECC601.6	Student will be able to suggest an appropriate design method of antenna system for the given specifications

Course Name:	CCN		
Course Code	ECC602		
Faculty Name:	Namita Agarwal		
Year	3	Sem	VI

CO Number	Course Outcome
ECC602.1	Students will be able to define and describe the basic concepts of computer networks
ECC602.2	Students will be able to discuss and explain the services provided, protocols used along with the design issues for each of the layers of computer networks.
ECC602.3	Students will be able to apply various error detection and correction methods along with routing algorithms .
ECC602.4	Students will be able to compare various protocols,multiple access techniques and routing algorithms used in computer networks.
ECC602.5	Students will be able to evaluate the performance of a computer network.
ECC602.6	Students will be able to formulate,design and apply subnet masks and addresses to fulfill networking requirements

Course Name:	Image Processing and Machine Vision (IPMV)		
Course Code	ECC603		
Faculty Name:	Dr. Satishkumar S. Chavan		
Year	3	Sem	VI

CO Number	Course Outcome
ECC603.1	Students will be able to know basics of image processing with fundamental processes.
ECC603.2	Students will be able to understand fundamental concepts of formation and sampling of images.
ECC603.3	Students will be able to improve the quality of an image in spatial domain as well as in frequency domain.
ECC603.4	Students will be able to interpret and analyze images in spatial and frequency domain.
ECC603.5	Students will be able to choose appropriate method to reconstruct original image from degraded image.
ECC603.6	Students will be able to design methods for processing images for human interpretation or further processing.

Course Name:	Artificial Neural Network and Fuzzy Logic (ANNFL)		
Course Code	ECC604		
Faculty Name:	Prof. Pratibha Dumane		
Year	3		VI

CO Number	Course Outcome
ECC604.1	Students will be able to define the various terms related to neural networks and also describe the neural network learning rules, their architectures (including Convolutional Neural Networks) and applications, fuzzy logic, fuzzy properties, fuzzy rules and fuzzy reasoning.
ECC604.2	Students will be able to explain the different types of supervised and unsupervised learning neural networks, fuzzification & defuzzification methods, fuzzy inference systems.
ECC604.3	Students will be able to select a particular neural network for specified application and apply fuzzy logic for specific applications.
ECC604.4	The students will be able to apply the different algorithms for given specifications of neural networks and analyze their outputs and deduce fuzzy relations using fuzzy logic.
ECC604.5	The students will be able to evaluate the given neural network for specific input patterns and activation functions.
ECC604.6	The students will be able to solve problems that include uncertainty using fuzzy membership functions and compositions.

Course Name:	Radar Engineering	
Course Code	ECCDLO6016	
Faculty Name:	Dr. Ashwini Kotrashetti	
Year	3	VI

CO Number	Course Outcome
ECCDLO6016.1	Student will be able to explain the fundamental concept of RADAR. They will be explain the working principle the different types of Radar displays and their application in real time scenario.
ECCDLO6016.2	Students will be able to demonstrate an understanding of the factors affecting the radar performance using Radar Range Equation.
ECCDLO6016.3	Students will be able to apply concepts of working principles to differentiate between different types of RADARS. Also they will be able to demonstrate an understanding of the importance of Matched Filter Receivers in Radars.
ECCDLO6016.4	Students will be able to analyze cases to identify the suitable measurement methodologies to characterize and verify the performance of radar systems
ECCDLO6016.5	Students will be able to evaluate design constraints for RADAR transmitters & receivers
ECCDLO6016.6	Students will be able to design radar systems computationally and use modern tools

Course Name:	Electromagnetics and Antenna Lab	
Course Code	ECL601	
Faculty Name:	Dr. Ashwini Kotrashetti	
Year	3	VI

CO Number	Course Outcome
ECL601.1	Students will be able to explain and define various antenna parameters and also explain propagation effects.
ECL601.2	Students will have basic knowledge and skills related to Antenna system and it's testing methods, they will be able to measure various antenna parameters
ECL601.3	Students will be able to apply their theoretical knowledge and demonstrate proficiency to operate various instruments like directional coupler, VNA and software like ANSYS HFSS
ECL601.4	Student will be able to analyse radiation pattern and S11 parameters to compare antennas with respect to certain defined antenna parameters
ECL601.5	Students will be able to investigate inorder to assess the need of adaptation for technological change in the field of antennas
ECL601.6	Student will be able to evaluate given specifications to arrive at appropriate theoretical design of antennas and validate through simulation

Course Name:	CCN LAB		
Course Code	ECL602		
Faculty Name:	Namita Agarwal		
Year	3	Sem	VI

CO Number	Course Outcome
ECL602.1	Students will be able to explain the various network devices and protocols used at each layer.
ECL602.2	Students will be able to understand and perform various network commands on Linux.
ECL602.3	Students will be able to apply error detection and correction techniques.
ECL602.4	Students will be able to analyze the traffic flow and protocol frames
ECL602.5	Students will be able to simulate and evaluate the performance of a computer network.
ECL602.6	Students will be able to design a computer network as per specific need.

Course Name:	Image Processing and Machine Vision Laboratory (IPMV LAB)		
Course Code	ECL603		
Faculty Name:	Dr. Satish Chavan		
Year	3	Sem	VI

CO Number	Course Outcome
ECL603.1	Students will be able to understand programming constructs for image processing and machine vision.
ECL603.2	Students will be able to read, modify, display and create images.
ECL603.3	Students will be able to improve the subjective quality of images in spatial domain and frequency domain.
ECL603.4	Students will be able to analyze and interpret the images for machine vision.
ECL603.5	Students will be able to choose appropriate filter to remove the noise.
ECL603.6	Students will be able to design filters for image processing and machine vison.

Course Name:	Skill Lab: Linux and Networking and Server Configuration
Course Code	ECL604
Faculty Name:	Prof. Aparna Telgote
Year	3	Sem	VI

CO Number	Course Outcome
ECL603.1	Students will be able to install Linux using different platform and execute standard Linux commands
ECL603.2	Students will be able to describe the basic knowledge of Linux Operating System
ECL603.3	Students will be able to deploy the system administrative functionality
ECL603.4	Students will be able to Solve the problems using shell script programming
ECL603.5	Students will be able to Develop network based applications
ECL603.6	Students will be able to Apply the Linux commands using programming skill to deploy different servers like ftp, telnet etc.

Course Name:	Mini Project 2B- FPGA based Project
Course Code	ECM601
Faculty Name:	Dr. Sudhakar Mande
Year	3	Sem	VI

CO Number	Course Outcome
ECM601.1	Understand various FPGA families and method of FPGA synthesis and implementation
ECM601.2	Learn the working of basic EDA tools like Xilinx, Modelsim cadence , etc
ECM601.3	Able to program, simulate and synthesize circuits in Verilog HDL
ECM601.4	Learn the technique of interfacing of LED, switches and seven segment with FPGA.
ECM601.5	Learn the project documentation, designing and handling techniques
ECM601.6	Analysis of FPAG fault detection and verification principles

Course Name:	RF Design		
Course Code	ECC801		
Faculty Name:	Ms. Freda C.		
Year	4	Sem	VIII

CO Number	Course Outcome
ECC801.1	Student will be able to explain concepts related to design of RF filter, Amplifier, Frequency generators, mixers, Frequency synthesisers .
ECC801.2	Student will be able to use stability, gain, noise circle equations,etc to solve problems on design of RF filter, Amplifier, Frequency generators, mixers, Frequency synthesisers.
ECC801.3	Student will be able to apply concepts to compare various types of microwave gain considerations based on the requirements /applications.
ECC801.4	Student will be able to analyse the performance of amplifier,oscillators and Filters using Smith Chart and arrive at a suitable design.
ECC801.5	Student will be able to identify EMI in RF circuits and study of various Electromagnetic Compatibility techniques.
ECC801.6	Student will be able to suggest an appropriate design method of system for the given specifications

Course Name:	WN		
Course Code	ECC802		
Faculty Name:	Aparna M. Telgote		
Year	4	Sem	VIII

CO Number	Course Outcome
ECC802.1	Students will be able to explain the fundamentals, architecture, design issues and standards of wireless networks
ECC802.2	Students will be able to classify the Wireless Network as per the coverage and list the various technologies associate with it.
ECC802.3	Student will be able to compare Body area network (BAN) and personal area network (PAN) technologies such as Zigbee, Bluetooth, UWB, RFID, NFC etc., WLAN and WMAN.
ECC802.4	Students will be able to give details of sensor network architecture, traffic related protocols , transmission technology etc
ECC802.5	Students will be able to calculate the coverage of 2G 3G cellular system
ECC802.6	Students will be able to design uplink and downlink budget for GSM, CDMA, WCDMA,HSDPA Technologies

Course Name:	NMT elective		
Course Code	ECCDL8044		
Faculty Name:	Poonam Chakraborty		
Year	4	Sem	VIII

CO Number	Course Outcome
ECCDL8044.1	The students will be able to define the fundamental principles and technical underlying standards in : Telecommunication, Networking and Information Technologies.
ECCDL80442.2	The students will be able to explain Communications Network Management Systems and their strengths and limitations.
ECCDL8044.3	The students will be able to model networked informative systems and continuously improve their technological knowledge and communication skills.
ECCDL8044.4	The students will be able to analyze operation and management of modern data communications networks.
ECCDL8044.5	The students will be able to compare the way technological change and emerging technologies might alter the assumptions for the underlying architectures systems and management tools.
ECCDL8044.6	The students will be able to propose the design of Network management model based on the case study.

Course Name:	RF Design Lab		
Course Code	ECL801		
Faculty Name:	Ms. Freda C.		
Year	4	Sem	VIII

CO Number	Course Outcome
ECL801.1	Student will be able to explain concepts related to design of RF filter, Amplifier.
ECL801.2	Student will be able to use stability, gain, noise circle equations,etc to design of RF filter,Oscillators, Amplifier.
ECL801.3	Students will be able to apply their theoretical knowledge and demonstrate proficiency to operate various instruments like directional coupler, VNA and software like GENESYS
ECL801.4	Student will be able to analyse performance of devices using S parameters to with respect to certain defined specifications.
ECL801.5	Students will be able to investigate and Assess current state of research on a topic and also Determine methodologies used in past studies of the same or similar topics
ECL801.6	Students will be able to design/simulate and evaluate the behaviour of microwave circuits

Course Name:	WN-LAB		
Course Code	ECL802		
Faculty Name:	Ms. Aparna T.		
Year	4	Sem	VIII

CO Number	Course Outcome
ECL802.1	Students will able to identify various hardware and software components required in the wireless networks.
ECL802.2	Students will able to demonstrate the configuration of WLAN, WPAN using packet Tracer
ECL802.3	Students will able to calculate the Qos parameter of wireless sensor network
ECL802.4	Students will able to apply uplink and downlink budget analysis for GSM, CDMA, WCDMA and HSPA Technologies
ECL802.5	Students will be able to create wired and wireless scenario using ns2 simulation
ECL802.6	Students will be able to design/write a report on a practical application on wireless network.

Course Name:	NMT-LAB		
Course Code	ECLDLO 8044		
Faculty Name:	Ms Poonam C		
Year	4	Sem	VIII

CO Number	Course Outcome
ECLDLO 8044.1	The students will be able to understand the basic tools used for network management, learn some some softwares like CISCO Packet Tracer, Networking tools and commands
ECLDLO 8044.2	The students will be able to experiments with basic network status monitoring tools using Linux commands and Packet Sniffer software or command line tools.
ECLDLO 8044.3	The students will be able to build various network using Packet Tracer
ECLDLO 8044.4	The students will be able to examine the various network behavior for the built network.
ECLDLO 8044.5	The students will be able to evaluate various performance parameters from the built network.
ECLDLO 8044.6	The students will be able to propose the Management software or network management tool reqired for doing the specific task in an organization.

Course Name:	PROJECT STAGE-II		
Course Code	ETP801		
Faculty Name:	Ms. Freda C.		
Year	4	Sem	VIII

CO Number	Course Outcome
ETP801.1	Students will be able to convert the design into a Product/Model/Prototype and validate the results.
ETP801.2	Students will be able to execute the project plan by working as a team to meet deadlines by maintaining ethics and professional responsibilities.
ETP801.3	Students will be able to present their work effectively through technical presentations, conference/journal publications and technical reports following ethical practices.