

**DON BOSCO INSTITUTE OF TECHNOLOGY, MUMBAI**  
**DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION**

<b>COURSE OUTCOMES</b>	
<b>CAY- (Odd semester, 2022-23)</b>	

<b>Course Name:</b>	BEE		
<b>Course Code</b>	FEC105		
<b>Faculty Name:</b>	Ms. Pratibha Dumane, Mr. Joshua Michale		
<b>Year</b>	1	Sem	I

CO Number	Course Outcome
FEC105.1	Students will be able to define the various laws, theorems, terms related to dc circuits, ac circuits, generation of three phase voltage, transformers and motors.
FEC105.2	Students will be able to explain the fundamental concepts related to dc circuits, ac circuits, generation of three phase voltage, transformers, motors and generators.
FEC105.3	Students will be able to solve problems by applying fundamentals laws, theorems of electricity to given dc and ac circuits and transformers.
FEC105.4	Students will be able to analyse the various parameters related to dc circuits, single phase and three phase ac circuits and transformers.
FEC105.5	Students will be able to evaluate the given single phase, three phase ac circuits, and transformers.
FEC105.6	Students will be able to simulate dc and ac circuits involving independent sources.

<b>Course Name:</b>	Applied Mathematics III		
<b>Course Code</b>	ECC301		
<b>Faculty Name:</b>	Ms. Manisha		
<b>Year</b>	2	Sem	III

CO Number	Course Outcome
ECC301.1	Students will be able to Demonstrate the knowledge of Laplace transforms, inverse Laplace transforms Fourier Series and integral, Vector algebra and calculus, Complex variable and Bessel Functions
ECC301.2	Students will be able to Understand Milne-Thomson method to find $f(z)$ , expand the periodic function by using Fourier series and complex form of Fourier series Plot the image of the curve from Z-plane to W-plane
ECC301.3	Students will be able to apply Laplace transform to solve diff. equations. Apply appropriate theorem of vectors in engg. subjects Apply appropriate transforms in telecommunication engineering
ECC301.4	Students will be able to Demonstrate an ability to identify, formulate, analyze and synthesis complex engg. problems using Laplace transforms, Fourier series and transforms, mapping, vectors and Bessel's functions
ECC301.5	Students will be able to work as a team by participating in the content beyond syllabus activity and peer learning happens through tutorial
ECC301.6	Students will be able to Participate and succeed in competitive exams.

<b>Course Name:</b>	Electronic Devices and Circuits		
<b>Course Code</b>	ECC302		
<b>Faculty Name:</b>	Dr. S. S Mande		
<b>Year</b>	2	Sem	III

CO Number	Course Outcome
ECC302.1	Students will be able to describe the operation of various semiconductor devices like pn junction, BJT, MOSFET and JFET and their applications.
ECC302.2	Students will be able to explain and discuss various types of semiconductor devices along with their I-V Characteristics and output waveforms with references to electronics circuits.
ECC302.3	Students will be able to apply the concept and derive the expressions for various performance measures of analog electronics circuits.
ECC302.4	Students will be able to analyze and relate circuit parameters with performance parameters
ECC302.5	Students will be able to evaluate and select suitable components to obtain proper performance of Amplifier circuits for the given specification
ECC302.6	Students will be able to design basic biasing circuits using BJT and MOSFET for a given specification and application

Course Name:	Digital System Design		
Course Code	ECC303		
Faculty Name:	Madhavi S. Pednekar		
Year	2	Sem	III

CO Number	Course Outcome
ECC303.1	Students will be able to remember various types of digital logic gates, digital circuits and logic families with examples.
ECC303.2	Students will be able to understand working of various combinational and sequential logic circuits.
ECC303.3	Students will be able to implement various combinational and sequential logic circuits.
ECC303.4	Students will be able to analyze logic circuits.
ECC303.5	Students will be able to evaluate and classify different types of logic circuits.
ECC303.6	Students will be able to simulate and implement combinational and sequential circuits.

Course Name:	Network Theory		
Course Code	ECC304		
Faculty Name:	Freda Carvalho		
Year	2	Sem	III

CO Number	Course Outcome
ECC304.1	The student will be able to learn the basic terminologies related to analysis of electrical circuits, Graph Theory & Two Port Networks.
ECC304.2	The student will be able to describe and identify the different theorems, parameters & terminologies used in the analysis of electrical circuits.
ECC304.3	The student will be able to apply the concepts of electrical circuit theory and compute the transient and steady state response of R, L, C circuits & Two Port Networks.
ECC304.4	The student will be able to analyze the effect of circuit elements on the stability and output characteristics of an electrical network.
ECC304.5	The student will be able to judge and select suitable components in order to make the output of a electrical network stable and in accordance with given requirements.
ECC304.6	The student will be able to design/synthesize electrical circuits as per given specifications.

Course Name:	Electronic Instrumentation and Control Systems		
Course Code	ECC305		
Faculty Name:	Dr. Ashwini Kotrashetti		
Year	2	Sem	III

CO Number	Course Outcome
ECC305.1	Students will be able to define and describe the basic terms and characteristics associated with electronic instruments. They will be able to define and describe the basic concepts of control systems.
ECC305.2	Students will be able to explain the principle of operation and discuss about the measurement of electrical and non-electrical parameters using transducers and bridges. The students will be able to understand the purpose of a control system and its usefulness in various applications through examples.
ECC305.3	Students will be able to apply their knowledge to find solutions to problems using transducers and bridges. Students will be able to apply the knowledge of Block diagram reduction and Signal flow graph rules to derive the mathematical model of a control system.
ECC305.4	Students will be able to analyze and compare the various transducers and bridges. They will be able to analyze time domain and frequency domain parameters for a given system using various techniques. They will be able to analyze stability conditions using appropriate criterias.
ECC305.5	Students will be able to evaluate transient and steady state error parameters of a system for different standard test signal.
ECC305.6	Students will be able to create models of different systems through simulation and analyze different parameters.

Course Name:	Electronic Devices and Circuits Lab		
Course Code	ECL301		
Faculty Name:	Mrs. Aparna Telgote, Mrs Poonam Chakraborty		
Year	2	Sem	III
<b>CO Number</b>	<b>Course Outcome</b>		
ECL301.1	Students will be able to acquire a basic knowledge of working of various equipments , identifying various components and mounting the components on breadboard.		
ECL301.2	Students will be able to understand working of rectifier with filter circuits and regulators and will be able to obtain the output waveforms and determine the performance parameters and compare with the theoretical value.		
ECL301.3	Students will be able to understand the working of small signal amplifiers and obtain its transfer and output characteristics and determine the parameters graphically.		
ECL301.4	Students will be able to obtain the frequency response of single stage amplifiers and determine the small signal voltage gain and determine the bandwidth.		
ECL301.5	Students will be able to apply the concept of stability factor and analyse various biasing circuits of BJT and JFET		

Course Name:	Digital System Design Lab		
Course Code	ECL302		
Faculty Name:	Ms. Madhavi S. Pednekar		
Year	2	Sem	III
<b>CO Number</b>	<b>Course Outcome</b>		
ECL302.1	Students will be able to identify various Digital ICs and basic building blocks of digital system design		
ECL302.2	Students will be able to understand working of by verifying the logical expressions using logic gate ICs.		
ECL302.3	Students will be able to apply their knowledge to construct combinational logic circuits like adder, subtractor, multiplexer, code converters etc.		
ECL302.4	Students will be able to design and implement various types of sequential circuits such as counters, registers		
ECL302.5	Students will be able to analyse basic flip flops to perform the inter conversions.		
ECL302.6	Students will be able to develop the digital logic circuits using VHDL/Verilog basic programming.		

Course Name:	Electronic Instrumentation and Control Systems Lab		
Course Code	ECL303		
Faculty Name:	Dr. Ashwini Kotrashetti		
Year	2	Sem	III
<b>CO Number</b>	<b>Course Outcome</b>		
ECL303.1	Students will be able to simulate and verify the principle and characteristics of various transducers.		
ECL303.2	Students will be able to experimentally demonstrate and measure the values of R,L,C using bridges.		
ECL303.3	Students will be able to simulate and verify the time domain specifications for a given system using open source simulation tool.		
ECL303.4	Students will be able to plot and analyze the time/frequency response of a given system.		
ECL303.5	Students will be able to inspect the stability of a system using various techniques.		

Course Name:	Skill Lab: C++ and Java Programming		
Course Code	ECL304		
Faculty Name:	Mrs. Poonam Chakraborty		
Year	2	Sem	III

CO Number	Course Outcome
ECL304.1	Students will be able to define the object oriented programming concepts of C++ and Java
ECL304.2	Students will be able to interpret building blocks of OOPs language, inheritance, package and interfaces, polymorphism
ECL304.3	Students will be able to demonstrate exception handling methods, string and class method, managing I/O, threading in Java
ECL304.4	Students will be able to select different programming applications using packaging and differentiate between CPP and Java
ECL304.5	Students will be able to summarize multithreading, Applet application programs in object oriented programs.
ECL304.6	Students will be able to anticipate the Utility and applicability of OOP and design an application for the given problem

Course Name:	Mini Project 1A		
Course Code	ECM301		
Faculty Name:	Dr. Satishkumar Chavan, Ms. Freda Carvalho and Ms. Gejo George		
Year	2	Sem	III

CO Number	Course Outcome
ECM301.1	Students will be able to To create the electronics circuit for particular application/experiment.
ECM301.2	Students will be able to To Design and simulate the circuits by putting together the analog and digital components
ECM301.3	Students will be able to To Learn the technique of soldering and circuit implementation on general purpose printed circuit board (GPP).
ECM301.4	Students will be able to To Realize the PCB design process and gain up-to-date knowledge of PCB design software.
ECM301.5	Students will be able to To Utilize the basic electronic tools and equipment's (like DMM, CRO, DSO etc.)
ECM301.6	Students will be able to To Analyse hardware fault (Fault detection and correction)

Course Name:	Digital Communications		
Course Code	ECC501		
Faculty Name:	Ms.Namita Agarwal		
Year	3	Sem	V

CO Number	Course Outcome
ECC501.1	Students will be able to define the basic concepts of information theory as applied to modern communication systems.
ECC501.2	Students will be able to understand and explain the methods of baseband and bandpass communication.
ECC501.3	Students will be able to apply source coding and channel coding techniques for efficient communication.
ECC501.4	Students will be able to analyze and compare the source coding ,channel coding and digital modulation techniques.
ECC501.5	Students will be able to evaluate the performance of baseband and bandpass systems.
ECC501.6	Students will be able to formulate and design error control systems for reliable communication.

Course Name:	Discrete Time Signal Processing		
Course Code	ECC502		
Faculty Name:	Dr. Satishkumar Chavan		
Year	3	Sem	V

CO Number	Course Outcome
ECC502.1	Students will be able to define the discrete time signals, systems and their various properties.
ECC502.2	Students will be able to explain the concepts of various tools to be used in analysis of discrete time systems.
ECC502.3	Students will be able to compute various parameters of discrete time systems
ECC502.4	Students will be able to analyze the discrete time systems for measuring the performance of digital filters.
ECC502.5	Students will be able to evaluate the discrete time systems for its better utilization in various applications.
ECC502.6	Students will be able to design the discrete time systems for effective use in various applications.

Course Name:	RSA		
Course Code	ECC504		
Faculty Name:	Ashwini Kotrashetti		
Year	3	Sem	V

CO Number	Course Outcome
ECC504.1	To understand the concept of random variables, their applications & random processes.
ECC504.2	To differentiate continuous and discrete random variables and their distributions
ECC504.3	To apply theory of probability in identifying and solving relevant problems.
ECC504.4	To analyze mean, variance, and distribution function of random variables and functions of random variables.
ECC504.5	To analyze linear regression algorithms and apply for predictive applications.
ECC504.6	To evaluate the type of the process and find the response of LTI system for WSS process.

Course Name:	Digital VLSI		
Course Code	ECC503		
Faculty Name:	Dr. Sudhakar Mande		
Year	3	Sem	V

CO Number	Course Outcome
ECC503.1	Students will be able to Know various tools and processes used in VLSI Design (Knowing)
ECC503.2	Students will be able to explain working of various CMOS combinational and sequential circuits (Understanding)
ECC503.3	Students will be able derive expression for performance parameters of various building blocks like CMOS inverter (Applying)
ECC503.4	Students will be able to relate performance parameters with design parameters of VLSI Circuits (Analyzing)
ECC503.5	Students will be able to select suitable circuit and design style of given specifications. (Evaluating)
ECC503.6	Students will be able to design and realize various combinational and sequential circuits for given specifications (Designing)

Course Name:	DATA COMPRESSION AND CRYPTOGRAPHY		
Course Code	ECCDLO5012		
Faculty Name:	Madhavi Pednekar		
Year	3	Sem	V

CO Number	Course Outcome
ECCDLO5012.1	Students will be able to define data compression and data encryption and to describe different types/algorithms of compression and encryption techniques with their applications in the areas of Telecommunication.
ECCDLO5012.2	Students will be able to understand suitable compression techniques for specified lossless and lossy audio and video applications.
ECCDLO5012.3	Students will be able to apply various compression techniques for text and video compression and number theory concepts to solve the cryptographic problems.
ECCDLO5012.4	Students will be compare between symmetric and asymmetric cryptography and also describe different symmetric cryptographic techniques and standards.
ECCDLO5012.5	Students will be able to analyze different public key cryptography algorithms and also describe methods that provide the goals for integrity, confidentiality and authentication.
ECCDLO5012.6	Students will be able to develop system security facilities designed to protect a computer system from security threats and also appreciate ethical issues related to system security.

Course Name:	Sensor Technology		
Course Code	ECCDLO5015		
Faculty Name:	Mrs. Poonam Chakraborty		
Year	3	Sem	V

CO Number	Course Outcome
ECCDLO5015.1	Students will be able to define the principles of various sensors and actuators
ECCDLO5015.2	Students will be able to explain the working of analog sensors, digital sensors, mems sensors,wireless sensors
ECCDLO5015.3	Students will be able to choose sensors for various application based on Accuracy, Environmental condition, Range, Calibration, Resolution , Cost and Repeatability
ECCDLO5015.4	Students will be able to Analyze various types of sensors, wireless sensing techniques, data acquisition systems and signal conditioning using various sensors
ECCDLO5015.5	Students will be able to Identify signal conditioning methods and sensors for a particular application
ECCDLO50125.6	Students will be able to plan an application using various sensing technologies

Course Name:	DSA		
Course Code	ECCDLO5014		
Faculty Name:	Mr. Nilesh Gavathe		
Year	3	Sem	V

CO Number	Course Outcome
ECCDLO5014.1	Define data structures like array, stack, queues and linked list
ECCDLO5014.2	Explain fundamentals of operation on the data structures
ECCDLO5014.3	Use different types of data structures operations and algorithms in a high level language for problem solving
ECCDLO5014.4	Analyze various data structure and algorithms
ECCDLO5014.5	Choose appropriate data structure while designing the algorithm
ECCDLO5014.6	Design algorithm for real world problem

Course Name:	DCOM LAB		
Course Code	ECL 501		
Faculty Name:	Namita Agarwal		
Year	3	Sem	V

CO Number	Course Outcome
ECL 501.1	Students will have the knowledge about the basic concept of digital communication system.
ECL 501.2	Students will be able to understand and experimentally demonstrate the different digital modulation techniques.
ECL 501.3	Students will be able to compute various parameters for a communication system.
ECL 501.4	Students will be able to simulate various coding techniques and analyze the simulation results.
ECL 501.5	Students will be able to evaluate the performance of a communication system
ECL 501.6	Students will be able to design error control codes as per specifications.

Course Name:	Discrete Time Signal Processing Lab		
Course Code	ECL502		
Faculty Name:	Dr. Satishkumar Chavan		
Year	3	Sem	V

CO Number	Course Outcome
ECL502.1	Students will be able to know the conditional looping system in programming language
ECL502.2	Students will be able to understand various approaches to be used in analysis of discrete time systems.
ECL502.3	Students will be able to compute various parameters of discrete time systems
ECL502.4	Students will be able to analyze the discrete time systems for measuring the performance of digital filters.
ECL502.5	Students will be able to evaluate the discrete time systems for its better utilization in various applications.
ECL502.6	Students will be able to design the discrete time systems for effective use in various applications.

Course Name:	DVLSI Lab		
Course Code	ECL503		
Faculty Name:	Dr. Sudhakar Mande		
Year	3	Sem	V

CO Number	Course Outcome
ECL503.1	Students will be able to write spice code for given combinational and sequential CMOS circuits.
ECL503.2	Students will be able to perform various analysis like operating point, dc, transient etc of given CMOS circuit
ECL503.3	Students will be able to evaluate performance of given CMOS circuits.
ECL503.4	Students will be able to draw layout of given CMOS circuit and also able extract various parasitic using open source layout tool like Magic
ECL503.5	Students will be able to design, simulate, and verify CMOS circuit for given specifications

Course Name:	Mini Project 2A		
Course Code	ECM501		
Faculty Name:	Jithin Isaac, Aparna Telgote		
Year	5	Sem	V

CO Number	Course Outcome
ECM501.1	Students will be able to understand embedded systems with design & BoM metrics.
ECM501.2	Students will be able to learn about 32 bit microcontrollers and programming in Embedded C.
ECM501.3	Students will be able to Implement Embedded systems integration with different sensors and peripherals as IoT.
ECM501.4	Students will be able to Implement Embedded systems with different communication protocols as IoT.
ECM501.5	Students will be able to Analyze concepts of Real time operating systems.
ECM501.6	Students will be able to Design embedded system applications using sensors, peripherals and RTOS

Course Name:	Microwave Engineering		
Course Code	ECC701		
Faculty Name:	Freda Carvalho		
Year	4	Sem	VII

CO Number	Course Outcome
ECC701.1	Students will have comprehensive knowledge and skills associated to Microwave passive, active components and Microwave integrated circuits
ECC701.2	Students will develop a capacity to write and explain the theoretical concepts related to Microwave passive & active components.
ECC701.3	Students will develop the ability to apply knowledge to solve problems and derive equations on working of microwave devices. They will be able to utilise the principles of microwave engineering towards solving problems of microstrip, coupled lines and strip lines.
ECC701.4	Students will develop the ability to analyse the working of matching networks and modes of waveguides, striplines, microstriplines and coupled lines
ECC701.5	Students will be able to evaluate the working of impedance matching networks, microwave devices, microwave tubes and semiconductor devices.
ECC701.6	Students will design a matching network for a microwave subsystem with the given specification

Course Name:	MCS		
Course Code	ECC702		
Faculty Name:	Aparna T		
Year	4	Sem	VII

CO Number	Course Outcome
ECC702.1	Students will be able to understand GSM, CDMA concepts and architecture, frame structure, system capacity, services provided
ECC702.2	Students will compare the 1G,2G,3G,4G with respect to data rate, frame structure, modulation schemes used, advantages and limitations
ECC702.3	Identify the emerging technologies for upcoming mobile communication systems.
ECC702.4	Students will be able to evaluate and analyze various propagation path loss models and their impact on received signal strength.
ECC702.5	Students will be able to simulate live wireless networks and analyze the simulation results
ECC702.6	Students will be able to design a cellular network which will take care of trade off between capacity and signal to interference ratio



Course Name:	INTERNET COMMUNICATION ENGG- ELECTIVE		
Course Code	ECCDLO 7033		
Faculty Name:	APARNA T.		
Year	4	Sem	VII

CO Number	Course Outcome
ECCDLO 7033.1	Students will be able to define various terms related to the internet communication and voice transfer.
ECCDLO 7033.2	Students will be able to compare OSI and TCP/IP model.
ECCDLO 7033.3	Students will be able to discuss the functions of the various protocols in use for Internet and voice communication.
ECCDLO 7033.4	Students will be able to choose the specific protocols for a given application.
ECCDLO 7033.5	Students will be able to analyse different protocols used in internet communication.
ECCDLO 7033.6	Students will be able to design various networks and subnetworks used in Internet communication according to specific applications.

Course Name:	Deep Learning		
Course Code	ECCDLO7012		
Faculty Name:	Pratibha Dumane		
Year	4	Sem	VII

CO Number	Course Outcomes
ECCDLO7012.1	Students will be able to state the various terms related to Deep Learning
ECCDLO7012.2	Students will be able to explain the concepts of TensorFlow, different types of regularization and optimization techniques, architectures of different CNNs and sequential and encoder models.
ECCDLO7012.3	Students will be able to use a particular CNN based upon the specified application.
ECCDLO7012.4	Students will be able to distinguish between the different CNN architectures and use them as per the application.
ECCDLO7012.5	Students will be able to evaluate the different CNN, Sequential and Encoder models.
ECCDLO7012.6	Students will be able to design and implement / modify different architectures in deep learning as per given specifications.

Course Name:	Microwave Engineering Laboratory		
Course Code	ECL701		
Faculty Name:	Freda Carvalho		
Year	4	Sem	VII

CO Number	Course Outcome
ECL 701.1:	Students will have basic knowledge and skills related to Microwave components and will be able to measure various microwave parameter
ECL 701.2	Students will be able to identify components in the measurement setup and explain their use.
ECL 701.3	Students will be able to apply their theoretical knowledge and demonstrate proficiency to operate various instruments to measure and analyze various microwave parameters.
ECL 701.4	Student will be able to analyse the obtained results through measurements and make valid conclusions
ECL 701.5	Student will be able to evaluate the obtained results and make comparisons of the measurement techniques
ECL 701.6	Students will be able to design/simulate and evaluate the behaviour of microwave circuits

Course Name:	Mobile Communication LAB		
Course Code	ECL702		
Faculty Name:	Aparna M. Telgote		
Year	4	Sem	VII

CO Number	Course Outcome
ECL702.1	Students will be able to find SAR value and various wireless technologies supported by the mobile and will understand generations of mobile phones
ECL702.2	Students will be able to understand performance characteristics of mobile communication(Frequency Reuse)
ECL702.3	Students will be able to generate code , and design basic CDMA Transceiver System
ECL702.4	Students will be able to apply various path loss models (Free space/Indoor propagation model ) to find path loss and calculate received signal strength, and coverage distance for different (urban, suburban and rural) environment
ECL702.5	Students will be able to analyse live network of 2G and 3G and HSDPA network
ECL702.6	Students will be able to evaluate performance of a cellular system for different environment by considering the effect of Cluster Size, traffic intensity, Signal to Interference ratio.

Course Name:	Project Stage-I		
Course Code	ETP701		
Faculty name	Mrs. Pratibha Dumane		
Year	4	Sem	VII

CO Number	Course Outcome
ETP701.1	Students will be able to identify the domain area of their project and also the Industrial/social/health/safety/legal/environment aspects.
ETP701.2	Students will be able to apply appropriate research methodologies & design techniques to provide solutions that meet specified needs with consideration for public health, safety & welfare, global cultural, social, environmental and economic factors.
ETP701.3	Students will be able to develop & conduct appropriate experimentation, analyze/ synthesize and interpret data using modern tools to draw valid conclusions.
ETP701.4	Students will be able to function effectively as a team, plan tasks, establish goals and meet objectives.
ETP701.5	Students will be able to demonstrate ethical and professional responsibilities.
ETP701.6	Students will be able to communicate effectively their work through technical reports and presentations.