B.Tech. in
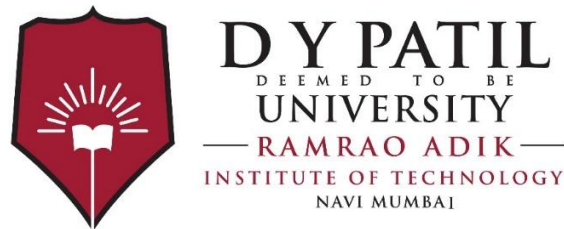
Electronics and Telecommunication Engineering

Scheme with Description

Academic Year 2020-21

Department of Electronics and Telecommunication Engineering

Ramrao Adik Institute of Technology

Bachelor of Technology in Electronics and Telecommunication Engineering
Semester-III

	Semester III							
		Teaching Scheme (Hrs)			**Credits assigned**			
Course Code	**Course name**	**TH (hr)**	**PR (hr)**	**TUT (hr)**	**TH**	**PR**	**TUT**	**Total Cr**
ETC301	Engineering Mathematics-III	3	--	1	3	--	1	4
ETC302	Electronic Devices and Circuits	4	2	--	4	1	--	5
ETC303	Digital Logic Design	3	2	--	3	1	--	4
ETC304	Feedback Control System	4	2	--	4	1	--	5
ETC305	Electrical Networks	3	--	--	3	--	--	3
ETL306	Electronic Workshop	--	4	--	--	2	--	2
HBSO301	Sustainable Business Strategy Program	--	--	--	--	--	--	1
AUC301	Audit Course 1: Constitution of India	2	--	--	--	--	--	--
	Total	**19**	**10**	**01**	**17**	**05**	**01**	**24**

Evaluation Scheme
Semester-III

Course Code	Course name	T1	T2	AVG	MSE	ESE	Exam Hrs.	TW	Pr / Or	Total Marks
ETC301	Engineering Mathematics-III	20	20	20	20	60	2	--	--	100
ETC302	Electronic Devices and circuits	20	20	20	20	60	2	25	25	150
ETC303	Digital Logic Design	20	20	20	20	60	2	25	25	150
ETC304	Feedback Control System	20	20	20	20	60	2	25	25	150
ETC305	Electrical Networks	20	20	20	20	60	2	--	--	100
ETL306	Electronic Workshop	--	--	--	--	--	--	50	--	50
	Total									**700**

Examination Scheme (Semester III)

Subject Description
Semester-III

Course Code	Course
ETC301	**Engineering Mathematics- III**
In this course, students will be provided the requisite and relevant background necessary to understand other important engineering mathematics courses offered in higher semesters. The students will be introduced Laplace transforms which is very useful for signal processing and communication engineering. The area of Complex Analysis will also be introduced to students which will be useful in further studies and competitive examinations like GRE, GATE and civil services. The areas like Probability, Sampling theory and testing of Hypothesis will be explored for further business and engineering techniques. The students will be able to gain basic and advanced knowledge of set theory, relations and functions which is useful for solving many engineering problems. The basic concepts and techniques of Linear Algebra will be explored in this course. These techniques are very useful in recent trends of industry.	

Course Code	Course
ETC302	**Electronic Devices & Circuits**
In this course physical operation of semiconductor devices, basic operation and performance of BJT and FET amplifiers, frequency response of small signal amplifiers, small and large signal amplifiers will be explored. After successful completion of the course student will be able to understand the current and voltage characteristics of Semiconductor Devices, DC and AC circuits of semiconductor devices, frequency response of BJT and FET amplifiers, power amplifier circuits.	

Course Code	Course
ETC303	**Digital Logic Design**
This course will explore students to various number systems. This will help in developing digital systems and also in design and implementation of combinational circuits, sequential circuits. Students are also explored to digital logic techniques using VHDL. After successful completion of the course student will be able to develop a digital logic and apply it to solve real life problems, characteristics of different logic families, implement combinational logic circuits, sequential logic circuits, combinational and sequential circuits using VHDL systems.	

Course Code	Course
ETC304	**Feedback Control Systems**

The students will learn fundamental concepts of control systems and mathematical modeling of the systems. This course will be useful in analysis and development of new systems. Various time and frequency tools aid in achieving above objectives. After successful completion of the course student will be able to derive the mathematical model of different type of control systems, analysis of systems in time domain & frequency domain.

Course Code	Course
ETC305	**Electrical Networks**

This course will provide essential fundamentals and will aid in understanding of DC and AC electrical networks. Analysis and design of networks will be carried out. The time and frequency domain analysis will be carried out for various systems. Synthesis of electrical networks and study various filters will help students design various networks. After successful completion of the course student will be able to apply their understanding of network theorems in analyzing complex circuits, time and frequency response of electrical circuits, synthesize electrical networks for a given network function and design simple filters.

Course Code	Course
HBSO301	**Sustainable Business Strategy Program**

Sustainable Business Strategy provides participants with the knowledge and tools to become a purpose-driven business leader. This course explores the different business models that companies can use to drive change and explains why purpose-driven businesses are particularly well positioned to tackle the world's biggest problems. The student will learn how to influence management and other key stakeholders on the competitive advantages of being a purpose-driven firm, and how to integrate the values into the work so that it can help transform firms into catalysts for system level change.

Course Code	Course
AUC301	**Constitution of India**

This course introduces students to the Constitution of India. It begins by providing an overview of the history of the making of Indian Constitution. It then discusses the preamble and the basic structures of the Constitution. The fundamental rights, duties and the directive principles of state policy will be discussed thoroughly, followed by a discussion of the legislature, the executive and the judiciary. Some of the important sections of the Constitution that have influenced the history of India since independence will also be taken up for study. These include emergency powers and special provisions. There will also be a study of the important amendments to the Constitution like the 42nd and 44th amendments and other amendments like those related to the right to education, panchayat raj and so on.

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

Bachelor of Technology in Electronics and Telecommunication Engineering
Semester-IV

Course Code	Course name	Teaching Scheme (Hrs)			Credits assigned			
		TH (hr)	PR (hr)	TUT (hr)	TH	PR	TUT	Total Cr
ETC401	Engineering Mathematics IV	3	--	1	3	--	1	4
ETC402	Electromagnetic Field Theory & Transmission Lines	3	--	1	3	--	1	4
ETC403	Analog Communication Engineering	4	2	--	4	1	--	5
ETC404	Discrete Time Signal Processing	4	2	--	4	1	--	5
ETC405	Linear Integrated Circuits and Applications	4	2	--	4	1	--	5
HBSO401	Entrepreneurship Essential Program	--	--	--	--	--	--	1
AUC401	Audit Course 2: Environmental Studies	2	--	--	--	--	--	--
	Total	**20**	**6**	**2**	**18**	**3**	**2**	**24**

Evaluation Scheme
Semester-IV

Course Code	Course name	T1	T2	AVG	MSE	ESE	Exam Hrs	TW	Pr/Or	Total Marks
	Examination Scheme (Semester IV)									
ETC401	Engineering Mathematics IV	20	20	20	20	60	2	--	--	100
ETC402	Electromagnetic Field Theory & Transmission Lines	20	20	20	20	60	2	--	--	100
ETC403	Analog Communication Engineering	20	20	20	20	60	2	25	25	150
ETC404	Discrete Time Signal Processing	20	20	20	20	60	2	25	25	150
ETC405	Linear Integrated Circuits and Applications	20	20	20	20	60	2	25	25	150
	Total									**650**

Subject Description
Semester-IV

Course Code	Course
ETC401	**Engineering Mathematics-IV**
To build the strong foundation in Mathematics, provide students with mathematics fundamentals necessary to formulate, solve and analyses complex engineering problems.After successful completion of the course student will be able to demonstrate basic knowledge of Random variables and probability distributions functions, basic concept of Random Processes, compute Eigen values and Eigen vectors, classify zeros, singular points, residues and their applications.	

Course Code	Course
ETC402	**Electromagnetic Field Theory & Transmission Lines**
To study correlation between electrostatics, steady magnetic field and time varying fields using Maxwell's equations for different media, electromagnetic problems using different numerical methods, propagation of the waves of different types, radiation concepts. After successful completion of the course student will be able to analyze the behavior of electromagnetic waves in different media, various parameters of transmission lines and radiating systems, computational techniques to analyze electromagnetic field distribution, mechanisms of radio wave propagation.	

Course Code	Course
ETC403	**Analog Communication Engineering**
To introduce the concepts of analog communication systems, modulation, demodulation, transmitters and receivers and noise performance, angle modulation. After successful completion of the course student will be able to understand and identify the fundamental concepts and various components of analog communication systems, modulation and demodulation techniques, transmitters and receivers and noise performance, angle modulation.	

Course Code	Course
ETC404	**Discrete Time Signal Processing**

To introduce students to the idea of signal and system analysis and characterization in time and frequency domain, signal and system concepts to areas like communication, control and comprehend applications, DFT and FFT and their applications, techniques and performance analysis of digital filters, digital signal processing applications. After successful completion of the course student will be able to understand continuous time and discrete time of Signals and Systems, time domain and frequency domain analysis of Signals and systems, discrete-time Fourier transform and fast Fourier transform, IIR digital filters, FIR digital filters, DSP for various applications.

Course Code	Course
ETC405	**Linear Integrated Circuits and Applications**

To understand the concepts, working principles and key applications of linear integrated circuits, analysis of circuits based on linear integrated circuits, particular applications using linear integrated circuits. After successful completion of the course student will be able to understand the fundamentals and areas of applications for the integrated circuits, practical circuits that perform the desired operations, theoretical, practical & simulated results in integrated circuits, appropriate integrated circuit modules to build a given application

Course Code	Course
HBSO401	**Entrepreneurship Essential program**

Entrepreneurship Essentials introduces you to the entrepreneurial journey from finding an idea, to gaining traction in the marketplace, to raising capital for your venture. This course explains how entrepreneurs run structured experiments to validate ideas and refine business strategy. You will dive deep into the numbers behind how entrepreneurs and their investors make financial decisions to create value and grow their operations.

Course Code	Course
AUC401	**Environmental Studies**
Environmental studies are a multidisciplinary academic field which systematically studies human interaction with the environment. Environmental studies connect principles from the physical sciences, commerce/economics, and social sciences to address complex contemporary environmental issues. It is a broad field of study that includes the natural environment, the built environment, and the relationship between them. The field encompasses study in basic principles of ecology and environmental science, as well as associated subjects such as ethics, geography, anthropology, policy, politics, urban planning, law, economics, philosophy, sociology and social justice, planning, pollution control and natural resource management	

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

Bachelor of Technology in Electronics and Telecommunication Engineering
Semester-V

Semester V								
		Teaching Scheme (Hrs)			**Credits assigned**			
Course Code	**Course name**	**TH (hr)**	**PR (hr)**	**TUT (hr)**	**TH**	**PR**	**TUT**	**Total Cr**
ETC501	Communication Networks	3	--	--	3	--	--	3
ETC502	Digital Communication	4	2	--	4	1	--	5
ETC503	Digital Image Processing	3	2	--	3	1	--	4
ETC504	Microcontrollers and Applications	3	2	--	3	1	--	4
ETC505	Data structures and Algorithms	3	2	--	3	1	--	4
ETL506	Professional Communication and Ethics lab	--	4	--	--	2	--	2
HBSO501	Financial Accounting	--	--	--	--	--	--	1
	Total	**16**	**12**	**0**	**16**	**6**	**0**	**23**

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

Evaluation Scheme
Semester-V

Course Code	Course name	T1	T2	AVG	MSE	ESE	Exam Hrs	TW	Pr/ Or	Total Marks
ETC501	Communication Networks	20	20	20	20	60	--	--	--	100
ETC502	Digital Communication	20	20	20	20	60	2	25	25	150
ETC503	Digital Image Processing	20	20	20	20	60	2	25	25	150
ETC504	Microcontrollers and Applications	20	20	20	20	60	2	25	25	150
ETC505	Data Structures and Algorithms	20	20	20	20	60	2	25	25	150
ETL506	Professional Communication and Ethics Lab	--	--	--	--	--	--	50	--	50
	Total									**750**

Subject Description
Semester-V

Course Code	Course
ETC501	**Communication Networks**
This course aims to provide an understanding on functioning of data communication system and study of different communication models, familiarize students with the importance computer networks, current and effective network systems. After successful completion of the course student will be able to understand functioning of data communication system and various communication models, different network in communication systems, functioning of layers in communication networks, networking.	

Course Code	Course
ETC502	**Digital Communication**
In this course, the students will be trained to identify the signals and functions of its different components, theoretical aspects of digital communication system and draw signal space diagrams, compute spectra of modulated signals, detection and correction to produce optimum receiver. After successful completion of the course student will be able to understand random variables and random processes of signal, Information Theory in source coding, Inter-symbol interference, baseband modulation techniques and different error control codes	

Course Code	Course
ETC503	**Digital Image Processing**
In this course, the students will get to learn digital image fundamentals, simple image processing techniques, image compression and segmentation techniques, image in form of features. After successful completion of the course student will be able to Analyze and understand theory and models in image processing, 2D signals in Spatial and frequency domain through image Transforms, segmentation and restoration for various applications, Different classification methods.	
Course Code	Course
ETC504	**Microcontroller and Applications**
This course demands to develop background knowledge and core expertise in microcontrollers, peripheral devices and their interfacing to microcontrollers, write programs for microcontrollers and their applications in Assembly and Embedded C Language. After successful completion of the course student will be able to Understand the detailed architecture of 8051 microcontrollers, working of the microcontrollers and their Instruction set, Interface various peripheral devices to the	

microcontrollers, Write Assembly language and Embedded C program for microcontrollers.

Course Code	Course
ETC505	**Data Structures and Algorithms**
In this course, the students will aid to design and implement various data structures, various techniques for representation of data in the real world, various ways of analyzing algorithms, problems using linear and nonlinear data structures. At the end of the course learner will able, to differentiate primitive and non-primitive structures, running time and space complexity of algorithms, operations like insertion, deletion, searching and traversing on various linear and non-linear data structures, apply appropriate data structure for solving real world problem, complexity of divide &conquer strategy, greedy design strategy	

Course Code	Course
ETC506	**Professional Communication & Ethics**
Professional Communication & Ethics will train the students to develop an effective style of writing important technical/business documents, investigate possible resources and plan a successful job campaign, personal traits, interests, values, aptitudes and skills, dynamics of professional communication required for career enhancement, effective workplace communication, personal code of ethics for regulating organizational behaviour, professional project presentations, group discussions, overcome workplace challenges by understanding professional relationships, ethical conduct, personal integrity and norms of organizational behaviour.	

Course Code	Course
HBSO501	**Financial Accounting**
This course will teach you the fundamentals of financial accounting from the ground up. You will learn how to prepare a balance sheet, income statement, and cash flow statement, analyze financial statements, and calculate and interpret critical ratios. You will also learn the role of managerial judgment in choosing accounting estimates and methods. The course concludes with an introduction to forecasting and valuation.	

Bachelor of Technology in Electronics and Telecommunication Engineering
Semester-VI

Semester VI								
		Teaching Scheme (Hrs)			Credits assigned			
Course Code	**Course name**	**TH (hr)**	**PR (hr)**	**TUT (hr)**	**TH**	**PR**	**TUT**	**Total Cr**
ETC601	Antenna Theory and Design	4	2	--	4	1	--	5
ETDLO601X	Stream Elective-I	3	2	--	3	1	--	4
ETDLO602X	Stream Elective-II	3	2	--	3	1	--	4
ETDLO603X	Stream Elective-III	3	2	--	3	1	--	4
ILO601X	Institute Elective	3	--	--	3	--	--	3
ETMP601	Mini Project-I	--	2	--	-	1	--	1
HBSO601	Economics for Managers	--	--	--	--	--	--	1
	Total	**16**	**10**	**0**	**16**	**5**	**0**	**22**

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

Evaluation Scheme
Semester-VI

	Examination Scheme (Semester VI)									
Course Code	**Course name**	**T1**	**T2**	**AVG**	**MSE**	**ESE**	**Exam Hrs**	**TW**	**Pr/ Or**	**Total Marks**
ETC601	Antenna Theory and Design	20	20	20	20	60	2	25	25	150
ETDLO601X	Stream Elective-I	20	20	20	20	60	2	25	25	150
ETDLO602X	Stream Elective-II	20	20	20	20	60	2	25	25	150
ETDLO603X	Stream Elective-III	20	20	20	20	60	2	25	25	150
ILO601X	Institute Elective	20	20	20	20	60	2	--	--	100
ETMP601	Mini Project-I	-	-	--	--	--	--	25	25	50
	Total									**750**

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

∗**Subjects Compulsory for Specialization in WSN** ∗∗**Subjects Compulsory for Specialization in ICT** ∗∗∗**Subjects Compulsory for Specialization in AI**	
Stream Elective I	**Subject Code**
1. Wireless & Mobile Communication∗, ∗∗	ETDLO6011
2. Statistical Signal Processing	ETDLO6012
3. RF Design	ETDLO6013
4. Radar Engineering	ETDLO6014
5. Artificial Intelligence∗∗∗	ETDLO6015
Stream Elective II	**Subject Code**
1. Advanced Technologies in Wireless Networks∗, ∗∗	ETDLO6021
2. Embedded Systems	ETDLO6022
3. Machine Learning∗∗∗	ETDLO6023
4. Software Defined Networks	ETDLO6024
Stream Elective III	**Subject Code**
1. Sensor and Signal Conditioning ∗	ETDLO6031
2. Multimedia Systems∗∗	ETDLO6032
3. Microwave Engineering	ETDLO6033
4. Data Base Management System∗∗∗	ETDLO6034

Institute Electives	Subject Code
Project Management	ILO6011
Cyber and Data Laws	ILO6012

Subject Description
Semester-VI

Course Code	Course
ETC601	**Antenna Theory Design**
This course will provide strong foundation to design and implement the different types of Antenna. It explores student to basic antenna parameters, derive the field equations of different antennas, design of uniform linear and planar antenna arrays, and implement micro strip antennas and reflectors. The main focus of the course is on Antenna Fundamentals, Radiation Mechanism, directivity, different parameters and types of antenna.	

Course Code	Course
ETDLO6011	**Wireless and Mobile Communication**
Wireless and mobile communication subject will clear the basics of functioning of wireless communication system, different Wireless Network architectures, GSM interface and protocol stack, GSM and CDMA Technologies. This course will able to help to solve the problems on Networks, Cellular Architecture, GSM Network, OFDM, Wireless LAN Topologies, IEEE 802.15 Standards.	

Course Code	Course
ETDLO6012	**Statistical Signal Processing**
The aim of this course is to provide knowledge of statistical techniques necessary to explain and explore the important applications in signal processing and telecommunication. After successful completion of the he can apply appropriate statistical tools for handling design and analysis of systems that involve randomness, analyze random processes for LTI systems and estimation theory. Course knowledge will provide the solutions to different problems related to stochastic process, correlation matrices from random process, Kalman filter.	

Course Code	Course
ETDLO6013	**RF Design**

This course will build the strong foundation in FR design of passive RF filters, RF amplifiers and oscillators, analyze EMI and EMC in RF circuits. It includes the RF behavior of passive components and modeling, RF filter design, two port amplifier design, two port oscillator design, mixers, electromagnetic interference and capability in RF circuits, EMI Coupling Modes, grounding in EMC, shielding Compromises

Course Code	Course
ETDLO6014	**Radar Engineering**

The course aims to introduce students to RADAR. It covers the topics like introductions to Radar, Radar Frequencies, Applications of Radar Equation, system implementation. After successful completion of the course student will be able to Solve problems using radar equations, different types of radar for specific application, tracking radar.

Course Code	Course
ETDLO6015	**Artificial Intelligence**

AI will provide the solution for searching problems using A∗, Mini-Max algorithms, logical agents to do inference using first order logic, Bayesian Networks to do probabilistic reasoning, Statistical learning using EM algorithm. The syllabus includes performance of logical, Bayesian networks, statistical learning using EM. Introduction to Artificial Intelligence, Fuzzy Logic, Fuzzy Rules, Artificial Neural Network.

Course Code	Course
ETDLO6021	**Advanced Technologies in Wireless Networks**

This course is about an understanding on functioning of wireless communication system and evolution of different wireless communication systems and standards, recent technologies used for wireless communication, architecture, functioning, protocols, capabilities and application of various wireless communication networks, multiple access techniques for Wireless Communication. It provide to students a strong foundation for their understanding on functioning of wireless communication system and evolution of different wireless communication systems and standards, different technologies used for wireless

communication systems, architecture, functioning, protocols, capabilities and application, multiple access techniques for Wireless Communication.

Course Code	Course
ETDLO6022	**Embedded Systems**
This course will provide the basic structure and design of an Embedded System, embedded hardware and software for systems realization, basics of RTOS for Embedded systems, programs for embedded systems and real time operating systems. Students can Identify and describe various characteristic features and applications of embedded systems, analyze and identify hardware for embedded systems implementation, program modelling concepts, embedded system, Real time operating systems and write programs, RTOS.	

Course Code	Course
ETDLO6023	**Machine Learning**
This course will enable students to understand different techniques related to Machine Learning, sequential decision-making methods in ML, key algorithms and theory that forms the foundation of machine learning. To analyse the principles, advantages, limitations and possible applications of machine learning, machine learning methods/algorithms for various type of learning problems, algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.	

Course Code	Course
ETDLO6024	**Software Defined Networks**
This course will aid to develop enquiring minds and encourage curiosity about conceptual understanding of software defined networks, data plane and the control plane, SDN Programming, applications of SDN. Learners will be able to analyze the evolution of software defined network, various components of SDN and their uses, use of SDN in the current networking scenario, various applications of SDN, SDN Design and Development.	

Course Code	Course
ETDLO6031	**Sensor and Signal Conditioning**
This course aims to understand the operation of different sensors. To understand basic measurement system of instruments. To understand the concept of signal conditioning. Learners will be able to understand basic measurement system and errors of instruments. To understand the operation of different sensors. To understand the concept of signal conditioning for sensors, Harmonic Distortion Analyzer, Spectrum and Network Analyzers.	

Course Code	Course
ETDLO6032	**Multimedia Systems**

In this course, the students will be trained to learn and understand technical aspect of Multimedia Systems, interaction problems introduced by multimedia compression and synchronization, techniques related to modern graphics programming concepts, various multimedia authoring systems, various networking aspects used for multimedia applications, multimedia application. Developed understanding of technical aspect of Multimedia Systems, various file formats for audio, video and text media, various Multimedia Systems applicable in real time, Design interactive multimedia software multimedia applications, multimedia application for its optimum performance.

Course Code	Course
ETDLO6033	**Microwave Engineering**

This course deals with study of understanding the effect, applications and propagation of microwave frequency, generation & amplification of microwave using vacuum tube technology, generation & amplification of microwave using solid state microwave devices. Learners will be able to design different impedance matching network, propagation of microwave and field pattern in waveguide, scattering matrix for n-port passive microwave devices, design and deployment of microwave networks, microwave parameters measurements

Course Code	Course
ETDLO6034	**Data Base Management System**

This course covers the learning and practicing data modeling using the entity-relationship and developing database designs, Structured Query Language (SQL) and learn SQL syntax, database processing and learn techniques for controlling the consequences of concurrent data access. Understand the different issues involved in the design and implementation of a database system, transform an information model into a relational database schema and to use a data definition language and/or utility to implement the schema using a DBMS, normalization theory and apply such knowledge to the normalization of a database,

Course Code	Course
ILO6011	**Project Management**
This course will get the students to familiarize the students with the use of a Project Management techniques and tools used in various industry sectors for achieving success in projects, apply processes and techniques throughout the life cycle of a project from initiation to closure. At the end of the course learner will able to apply project selection criteria using quantitative and qualitative tools, analyze effect of different organizational structures on the execution of projects, perform project planning activities, perform project control activities, control, and closure of projects.	

Course Code	Course
ILO6012	**Cyber and Data Laws**
In this course, the students will be trained to be introduced the cyber world and cyber law in general, various facets of cyber-crimes, online transactions challenges, Intellectual Property issues in the cyber space, regulation of cyber space at national and international level. At the end of the course learner will able to understand the cyber world and cyber law various facets of cyber-crimes, online transactions challenges, Intellectual Property issues in the cyber space, regulation of cyber space at national and international level.	

Course Code	Course
ETMP601	**Miniproject I**
The main intention of Mini Project is to make student enable to apply the knowledge and skills learned out of courses studied to solve/implement predefined practical problem. The students undergo various laboratory/tutorial/simulation laboratory/work shop courses in which they do experimentation based on the curriculum requirement. The Mini Project may be beyond the scope of curriculum of courses taken or may be based on the courses but thrust should be on Learning additional skills. This course will develop ability of students to define and design the problem and lead to its accomplishment with proper planning. Students will learn behavioural science by working in a group.	

Course Code	Course
HBSO601	**Economics for Managers**
Economics for Managers applies fundamental economic principles to real-world business challenges. You will dive into topics like customer demand, supplier cost, markets, and competition. You will learn how businesses think about pricing, production, and differentiation. In the process, you will learn how to develop the beginnings of a competitive strategy that will lead to a business thriving over time.	

Bachelor of Technology in Electronics and Telecommunication Engineering
Semester-VII

Semester VII								
		Teaching Scheme (Hrs)			**Credits assigned**			
Course Code	**Course name**	**TH (hr)**	**PR (hr)**	**TUT (hr)**	**TH**	**PR**	**TUT**	**Total Cr**
ETC701	Optical Communication	4	2	--	4	1	--	5
ETDLO704X	Stream Elective-IV	3	2	--	3	1	--	4
ETDLO705X	Stream Elective-V	3	2	--	3	1	--	4
ETDLO706X	Stream Elective-VI	3	2	--	3	1	--	4
ILO702X	Institute Elective	3	--	--	3	--	--	3
ETMP702	Miniproject-II	--	2	--	--	1	--	1
	Total	**16**	**10**	**0**	**16**	**5**	**0**	**21**

Evaluation Scheme
Semester-VII

Examination Scheme (Semester VII)										
Course Code	Course name	T1	T2	AVG	MSE	ESE	Exam Hrs	TW	Pr/ Or	Total Marks
ETC701	Optical Communication	20	20	20	20	60	2	25	25	150
ETDLO704X	Stream Elective-IV	20	20	20	20	60	2	25	25	150
ETDLO705X	Stream Elective-V	20	20	20	20	60	2	25	25	150
ETDLO706X	Stream Elective-VI	20	20	20	20	60	2	25	25	150
ILO702X	Institute Elective	20	20	20	20	60	2	--	--	100
ETMP702	Miniproject-II	-	-	--	--	--	--	25	25	50
	Total									**750**

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

*Subjects Compulsory for Specialization in WSN	
**Subjects Compulsory for Specialization in ICT	
***Subjects Compulsory for Specialization in AI	

Stream Elective IV		**Subject Code**
1.	Ad-hoc Wireless Sensor Networks*	ETDLO7041
2.	Internet of Things	ETDLO7042
3.	Deep learning***	ETDLO7043
4.	Advanced Mobile communication	ETDLO7044
5.	Ecommerce and Digital Marketing**	ETDLO7045
Stream Elective V		**Subject Code**
1.	Network Protocols & Routing Algorithms*	ETDLO7051
2.	Biomedical Signal Processing	ETDLO7052
3.	Satellite Communication networks	ETDLO7053
4.	Big Data Analysis***	ETDLO7054
5.	Social Engineering**	ETDLO7055
Stream Elective VI		**Subject Code**
1.	Cognitive Radio*	ETDLO7061
2.	Speech Processing	ETDLO7062
3.	Robotics	ETDLO7063

4.	Data Compression and Encryption	ETDLO7064
5.	Intelligent ICT Systems ∗∗	ETDLO7065
6.	Computer Vision∗∗∗	ETDLO7066

Institute Electives	Subject Code
Intellectual Property Rights	ILO7021
Operations Research	ILO7022

Subject Description
Semester-VII

Course Code	Course
ETC701	**Optical Communication**
This course will build the fundamentals and transmission characteristics of optical fiber and different components, nonlinear optical fiber, calculate the optical link parameters and link budget analysis. At the end of the course learner will able to understand and acquired the knowledge about the fundamental of optical fiber and wave theory, characteristics of optical fiber and concept of nonlinearities, understand and able to characterized the working principle of different sources, working principle of different detectors, working of fabrication process, optical link budget and study different link parameters	

Course Code	Course
ETDLO7041	**Ad-hoc and Wireless Sensor Networks**
In this course learners will be able to understand the concept of adhoc and sensor networks and their applications. Evaluate performance of various protocols in wireless sensor and adhoc networks. They will understand the major challenges and designing issues in designing wireless sensor and adhoc networks.	

Course Code	Course
ETDLO7042	**Internet of Things**
The Internet of Things IoT is a course about the new paradigm of objects interacting with people, with information systems, and with other objects, hands-on project development. At the end of the course learner will able to understand the concepts of Internet of Things Analyze basic protocols in wireless sensor network, IoT applications in different domain, basic IoT applications on embedded platform.	

Course Code	Course
ETDLO7043	**Deep Learning**

In this course they will able to to analyze the principles, advantages, limitations and possible applications of machine learning, suitable machine learning methods/algorithms for various type of learning problems, apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Course Code	Course
ETDLO7044	**Advanced Mobile Communication**

In this course they will be able to analyse, model and design and implement the newest architectures, protocols and communication interfaces for mobile communication systems, ability to analyse, model and apply advanced mobile communication techniques. At the end of the course learner will able to demonstrate an understanding on functioning of mobile communication Technology, 3G technology, LTE for mobile communication technology, LTE-A, LTE-A Pro, and introduction to 5G technology.

Course Code	Course
ETDLO7045	**Ecommerce and Digital Marketing**

This course helps to understand increasing significance of E-Commerce and its applications in Business and Various Sectors, Digital Marketing activities on various Social Media platforms and its emerging significance in Business, E-Commerce and Digital Marketing, Challenges and Opportunities for an Organization. At the end of the course learner will able to understand basic concepts of Ecommerce and M-commerce, technologies of Ecommerce, E Business and its applications, different payment gateways and types of transactions security, Digital marketing and its techniques, different social media marketing strategies.

Course Code	Course
ETDLO7051	**Network Protocols & Routing Algorithms**

This course gives an understanding on functioning of communication system and study of different network models. To make students aware of the IP addressing in both fixed computer and mobile networks in particular. Learners will be able to demonstrate their understanding on functioning of data communication system and various communication models. Understand

functioning of Application layer protocol. Demonstrate an ability to explain data link layer protocols and higher layer protocols.

Course Code	Course
ETDLO7052	**Biomedical Signal Processing**
This course describes the origin, properties and suitable models of important biological signals such as ECG and EEG, Develop the mathematical and computational skills relevant to the field of biomedical signal processing, Increase the student's awareness of the complexity of various biological phenomena and cultivate an understanding of the promises, challenges of the biomedical engineering.	

Course Code	Course
ETDLO7053	**Satellite Communication networks**
This course will help them to understand the basics of satellite communications and different satellite communication orbits, in-depth understanding of satellite communication system operation, launching techniques, satellite link design and earth station technology, Review the state of the art in new research areas. Explain and analyze link budget of satellite signal for proper communication, understand various applications of satellite communications.	

Course Code	Course
ETDLO7054	**Big Data Analysis**
This course will help them to understand the key issues in big data management and its associated applications in intelligent business and scientific computing. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.	

Course Code	Course
ETDLO7055	**Social Engineering**
This course will help them to understand Human OS Architecture and inner workings and Psychological principles abused during Social Engineering attacks, attack mitigation, risk with attack, and role of social engineering in hyper-connected world. They will be able to develop scripts from social engineering audits	

Course Code	Course
ETDLO7061	**Cognitive Radio**
Know the basics of the software defined radios. Learn the design of the wireless networks based on the cognitive radios. Understand the concepts of wireless networks and next generation networks. Learners will be able to describe the basics of the software defined radios. Design the wireless networks based on the cognitive radios. Explain the concepts behind the wireless networks and next generation networks	

Course Code	Course
ETDLO7062	**Speech Processing**
This course is designed to lay the foundation for further studies in areas such as communication, signal processing, and control systems etc. This course will explore the basic concepts of signals and systems. Students will understand and learn various types of signals, signal operations and representation of signal and system in time and frequency domain using Fourier and Laplace transform. In this course, more emphasis is given on analysis of continuous time signals and systems. Students will able to apply the basic knowledge of signal and system in real time applications in day to day life.	

Course Code	Course
ETDLO7063	**Robotics**
This course is deals with the foundation and further studies in areas such as robotics, Actuator, etc. This course will explore the basic concepts of robotics. Students will understand and learn various grippers, vacuum & other methods of gripping. In this course, more emphasis is given on analysis of robotics Motion Planning and Controllers.	

Course Code	Course
ETDLO7064	**Data Compression and Encryption**
This course introduces areas such as data compression and Encryption, security challenges, etc. This course will explore the basic concepts of cryptography. Students will understand and learn various compression techniques. In this course, Text compression, Audio compression and video compression will be studied thoroughly.	

Course Code	Course
ETDLO7065	**Intelligent ICT Systems**
To have relevant, discipline based knowledge, skills and values, web mining concepts being used, Google cloud platform, modern data, Machine Learning, Green ICT. Students will be able to describe and find intelligence in web contents, Retrieve various information available on website, Google cloud platforms, modern data, machine learning algorithms on data, Green ICT etc.	

Course Code	Course
ETDLO7066	**Computer Vision**
This course will aid to develop enquiring minds and encourage curiosity about both the theoretical and practical aspects of computing with images, foundation of image formation, measurement, and analysis, robust image matching and alignment, 2D images and the 3D world. At the end of the course learner will able to demonstrate knowledge and understanding of Human and computer vision systems, image formation and image modelling, range of algorithms for image processing and computer vision, solutions to problems in computer vision.	

Course Code	Course
ILO7021	**Intellectual Property Rights**
To understand intellectual property rights protection system. To give an idea about IPR, registration and its enforcement. To promote the knowledge of Intellectual Property Laws of India as well as International treaty procedures. Student will be able to learn and understand Intellectual Property assets, Assist individuals and organizations in capacity building. Work for development, promotion, protection, compliance, and enforcement of Intellectual property	

Course Code	Course
ILO7022	**Operations Research**
Operations Research deals with modelling, analysis and solution to real life problems. This course will focus on mathematical modelling and will use deterministic and probability techniques for optimization and decision making. Linear and Integer Programming techniques will be introduced. At the end of the course, students will have the skills to build their own formulations, to expand existing formulations, to critically evaluate the impact of model assumptions and to choose an appropriate solution technique for solving real world problems.	

Course Code	Course
ETMP701	**Miniproject II**
The main intention of Mini Project is to make student enable to apply the knowledge and skills learned out of courses studied to solve/implement predefined practical problem. The students undergo various laboratory/tutorial/simulation laboratory/work shop courses in which they do experimentation based on the curriculum requirement. The Mini Project may be beyond the scope of curriculum of courses taken or may be based on the courses but thrust should be on Learning additional skills This course will develop ability of students to define and design the problem, and lead to its accomplishment with proper planning .Students will learn behavioural science by working in a group. The topic of Mini Project I and II may be different and / or may be advancement in the same topic.	

Ramrao Adik Institute of Technology, Nerul, Navi Mumbai.
Department of Electronics and Telecommunication Engineering

Bachelor of Technology in Electronics & Telecommunication Engineering
Semester-VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ETP801	Project/Internship	--	30	--	--	15	--	15
	Total	--	**30**	--	--	**15**	--	**15**

Evaluation Scheme
Semester-VIII

Course Code	Course Name	T1	T2	AVG	MSE	ESE	Exam Hrs	TW	Pr/Or	Total
ETP801	Project/Internship	--	--	--	50	--	--	100	100	250
	Total	--	--	--	**50**	--	--	**100**	**100**	**250**