CHANDIGARH UNIVERSITY
GHARUAN

Electronics &
Communication Engineering

Registrar
Chandigarh University
Gharuan, Mohali-140413

Name of the Department: ECE **Name of the Program: B.E. (ECE)**

Duration of the degree: 04 Years Program Code: EC 201

Program Outcomes

PO 1: Ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems

PO 2: Ability to identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;

PO 3: Ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations;

PO 4: Ability to conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;

PO 5: Ability to create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations

PO 6: Ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice;

PO 7: Ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development;

PO 8: Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice

PO 9: Ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

PO 10: Ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;

Registrar
Chandigarh University
Gharuan, Mohali-140413

PO 11: Ability to recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological change;

PO 12: Ability to demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary.

Program Specific Outcome

I. To prepare students with a firm foundation in mathematical, scientific and engineering fundamentals required to excel in higher education or to succeed in industry / technical profession.

II. To develop the good scientific knowledge and technical skills in students required to be and to remain productive in the field of Electronics & Communication Engineering as well as in diverse environments.

III. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context and socioeconomic concerns in resolving technical problems.

IV. To provide student with an academic environment aware of excellence, leadership, life-long learning and professional development for a successful and rewarding career.

Registrar
Chandigarh University
Gharuan, Mohali-140413

SEMESTER III

ECY 233	Python Lab	L	T	P	C
	Total Contact Hours – 24 Hours Applicable to : ECE	0	2	0	2
	Pre-requisites: None				

Course Objective	
To help students to feel justifiably confident of their ability to write small programs and map scientific problems into computational framework.	
	Course Outcomes
1.	Students will be able to demonstrate a competency in using programming language for various platforms
2.	Students will be able to design various graphic applications and games.
3.	Students will be able to familiarize and work on Linux OS.

ECT 231	Electromagnetic Field Theory	L	T	P	C
	Total Contact Hours 60 Applicable to which branch ECE	3	1	0	4
	Prerequisite Applied Physics				

Course Objective	
1.Understand the basic concepts of electric and magnetic fields	
2. Understand the concept of conductors, dielectrics, inductance and capacitance	
3. Gain knowledge on the nature of magnetic materials.	
4. Understand the concept of static and time varying fields.	
	Course Outcome
1.	Understand the basics theory of electromagnetic waves traveling from source to destination
2.	Understand the basics of radiating elements
3.	Get in depth knowledge of transmission lines and wave guide

ECT 234	NETWORK ANALYSIS AND SYNTHESIS	L	T	P	C
	Total Contact Hours: 42 Applicable to branch : ECE	3	1	0	4
	Pre-requisite: Knowledge of basic electrical components.				

	Course Objective
1.	To provide a clear understanding of all the techniques for analyzing an electrical network.
2.	To analyze the steady state response and transient response of an electrical network.
3.	To make the students capable of synthesizing an electrical network.
	Course Outcome
1.	Application of various network theorems to the different networks.

Registrar
Chandigarh University
Gharuan, Mohali-140413

2	Students will be able to analyze the steady state response and transient response of first and second order circuits.
3.	Students will be able to synthesize an electrical network from given impedance/admittance function.

ECT 232	**Digital Hardware Design**	**L**	**T**	**P**	**C**
	Total Contact Hours: 42	**3**	**0**	**0**	**3**
	Applicable to which branch: ECE				
	Prerequisite :				

Course Objective

1. To understand Merits of digitization.
2. To enable students to develop circuits using various minimization techniques.
3. To prepare students to perform the analysis and design of various digital electronic circuits.

Course Outcome

1.	To understand and examine the structure of various number systems and its application in digital design
2.	Ability to identify basic requirements for a design application and propose a cost effective solution.
3.	To develop skill to build, and troubleshoot digital circuits.

ECT 233	**Signals and Systems**	**L**	**T**	**P**	**C**
	Total Contact Hours 42	**3**	**0**	**0**	**3**
	Applicable to which branch: ECE				
	Prerequisite: Knowledge of Fourier series and Transforms				

	Course Objective
1.	Understand the nature of continuous and discrete time signals and their applications in engineering systems.
2.	Apply the concepts of Fourier series representations to analyze continuous and discrete time periodic signals.
3.	Understand and apply the Fourier Transform and Laplace Transform to the analysis and description of LTI systems.
	Course Outcome
1.	Understanding the fundamental characteristics of signals and systems.
2.	Understanding signals and systems in terms of both the time/space and transform domains.
3.	Development of the mathematical skills to solve problems involving convolution, filtering and sampling.

ECP 238	**Electronic Devices & Circuits Lab**	**L**	**T**	**P**	**C**
	Total Contact Hours: 30	**-**	**-**	**2**	**1**
	Applicable to which branch (ECE): Batch 2017				

Registrar
Chandigarh University
Gharuan, Mohali-140413

Course Objective	
1. To prepare students to perform the analysis of any Analog electronics circuit.	
2. To empower students to understand the design and working of BJT amplifiers and oscillators.	
3. To prepare the students for advanced courses in Communication system Circuit Design.	
	Course Outcome
1.	Develop the Ability to understand the design and working of BJT amplifiers. Observe the effect of feedback on different parameters of an Amplifier and different types of negative feedback topologies.
2.	Able to design amplifier circuits using BJT s and observe the amplitude and frequency responses of amplifier circuits.
3.	Observe the effect of positive feedback and able to design and working of different Oscillators using BJTS.

	RDBMS	L	T	P	C
ECP 237	Total Contact Hours : 48; Batch: 2018-2022 Prerequisite: Basics of Computer programming	**0**	**0**	**4**	**2**

Course Objectives

- To enable students to retrieve and update data from relational databases using SQL/ Oracle.
- To implement programs using PL/SQL structure.
- To have good understanding of implementation and use of cursors, procedures, packages, triggers etc.

Course Outcome

Students should have a good understanding of how several fundamental algorithms work, particularly those concerned with creation and updating of tables.

Student will be able to understand various queries and their execution in SQL and PL/SQL.

Student will be able to design new database and modify existing ones for new applications and reason about the efficiency of the result.

	JAVA Programming	L	T	P	C
ECP 236	Total Contact Hours : 48 Batch: 2017 Prerequisite: Basics of Computer programming	**0**	**0**	**4**	**2**

Course Objectives

- To understand the concepts of object oriented, event driven and concurrent programming paradigms and develop these skills using java.
- To be able to work on projects using java database connectivity i.e. JDBC.

Course Outcome

Students will be able to demonstrate a competency in using programming language for various platforms.

With the learning of various technologies such as HTML, students will be able to design websites.

Students will be able to design various graphic applications and games.

Registrar
Chandigarh University
Gharuan, Mohali-140413

Student will improve their coding and designing concepts and it will help them in learning more advanced languages in future.

ECP 239	**Digital Hardware Design Lab**	**L**	**T**	**P**	**C**
	Total Contact Hours: 30	**0**	**0**	**2**	**1**
	Applicable to which branch (ECE): Batch 2017				
Course Objective					
1. To implement truth tables using basic gates. 2. To design various Digital circuits using basic logic gates.					
	Course Outcome				
	Students will be able to understand how to use:				
1	Able to analyze and design combinational and sequential circuits.				
2	Understand the importance and need for verification, testing of digital logic and design for testability.				

ECY 231	**E-Commerce**	**L**	**T**	**P**	**C**
	Total Contact Hours : 28	**2**	**0**	**0**	**2**
	Prerequisite: None				
Course Objective					
This course provides a better understanding of the concepts of Electronic Commerce					
	Course Outcomes				
1	E-Commerce Framework, EDI				
2	Security in E-Commerce				
3	Intelligent Agents				

SEMESTER V

SMY-222	**ENGINEERING MATHEMATICS**	**L**	**T**	**P**	**C**
	Total contact hours : 45	**3**	**1**	**0**	**MNG**
	Applicable to which branch: All branches of Engineering **LEET -2018** **(Mandatory Non Graded Course)**	Common to all branches of Engineering LEET (3rd semester)			
	Prerequisite: Knowledge of mathematics up to senior secondary level.				
PURPOSE					
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering					
Unit	**INSTRUCTIONAL OBJECTIVES**				
1.	To have knowledge in linear algebra and infinite series.				
	To improve their ability of computation in matrices and complex nos.				
2.	To familiarize students with partial differentiation.				
	To enable the students to apply the notions practically.				
3.	To have knowledge Multiple Integral And Vector Calculus				

Registrar
Chandigarh University
Gharuan, Mohali-140413

ECT 301	Electromagnetic Field Theory	L	T	P	C
	Total Contact Hours:42	3	0	0	3
	Applicable to which branch ECE				
	Prerequisite Applied Physics				

Course Objective

1.Understand the basic concepts of electric and magnetic fields

2. Understand the concept of conductors, dielectrics, inductance and capacitance

3. Gain knowledge on the nature of magnetic materials.

4. Understand the concept of static and time varying fields.

	Course Outcome
1.	Understand the basics theory of electromagnetic waves traveling from source to destination
2.	Understand the basics of radiating elements
3.	Get in depth knowledge of transmission lines and wave guide

ECT-302	DIGITAL COMMUNICATION	L	T	P	C
	Total Contact Hours : 48	3	0	0	3
	Applicable to which branch: ECE				
	Prerequisite: Analog Communication, Digital Electronics				

Course Objective

To present the fundamentals of modern digital communication system design and to evaluate the performance of digital signaling schemes on realistic communication channels.
Emphasis is placed on physical layer digital communications, including waveform design and receiver design. This is a course in "communication signal processing."

Unit	Course Outcome
1.	Understand the concepts of pulse modulation systems.
2.	Analyze the digital formats and various digital modulation techniques.
3.	Familiarize with the error free transmission of digital data.

Subject Code ECT-303	Microelectronics	L	T	P	C
	Total Contact Hours : 48	3	0	0	3
	Applicable to which branch: ECE				
	Prerequisite : Applied Physics				

Course Objective

1.To study the characteristics of MOSFET.
2.Ability to use equipment, process and chemical reactivity data to define a process flow for a particular fabrication module.
3 Ability to differentiate and analyze basic trade-offs in processing parameters and how these affect the desired process output.
4.Understanding of fundamental challenges in fabrication techniques and possible solutions.

	Course Outcome
1.	Able to design integrated silicon based devices' process steps.
2.	Understand all silicon fabrication processes, their metrologies and related theory.

3.	Develop an understanding of the complexities involved in a complete fabrication cycle of an integrated circuit.

ECT 304	**Microcontrollers**	**L**	**T**	**P**	**C**
	Total Contact Hours: 42	**3**	**0**	**0**	**3**
	Applicable to ECE				
	Prerequisite : Digital electronics, microprocessors				
Course Objective					
1.To analyze the basic concepts and programming of 8051 microcontroller.					
2.To provide sufficient detailed knowledge of a microcontroller so that students can breadboard and program a microcontroller and demonstrate its function in a real time application in the laboratory.					
	Course Outcome				
1.	To understand the fundamentals of CISC based 8 bit microcontroller with the help of 8051.				
2.	To implement and practice the learning of the subject into development.				
3.	To cope up with latest industry practices and make linkage between theory and practical.				

Registrar
Chandigarh University
Gharuan, Mohali-140413

Subject Code ECT-305	LINEAR INTEGRATED CIRCUITS	L	T	P	C
	Total Contact Hours: 28	2	-	-	2
	Applicable to which branch : ECE				
	Prerequisite : Basics of Electronics Engineering				

Course Objective

1. Introduce basic building blocks of linear integrated circuits.
2. Use tools covering the back end design stages of digital integrated circuits.
3. Study the concept of waveform generation and some special function IC's

	Course Outcome
	Students will be able to understand:
1.	The performance of op-amp.
2.	Analyze the wave shaping circuits and operational amplifies.
3.	Analysis of various applications using IC 555.

Registrar
Chandigarh University
Gharuan, Mohali-140413

Subject Code- ECP 307	MicroController Lab	L	T	P	C
	Total Contact Hours: 24	-	-	2	1
	Applicable to which branch : ECE				
	Pre-requisite: Microprocessor and Microcontrollers				

Course Objective

To provide sufficient detailed knowledge of a microcontroller so that students can breadboard and program a microcontroller and demonstrate its function in a real time application in the laboratory.

	Course Outcome
	Students will be able to understand how to use:
1.	To enable students to get acquainted to Microcontroller programming basics
2.	To enable students to learn interfacing of basic I/O peripherals.
3.	Students will be able to simulate and implement the control environment using microcontroller

ECP-308	Digital Communication lab	L	T	P	C
	Total Contact Hours 24	0	0	2	1
	Applicable to which branch ECE				
	Prerequisite:				

Course Objective

1.Demonstrate understanding of various digital modulation and demodulation techniques.

2.Analyze the performance of modulation and demodulation techniques in various transmission environments

	Course Outcome
1.	To enable students to get acquainted about different Digital Communication Techniques.
2.	To enable students to learn error detection and correction techniques.
3.	Students will be able to simulate digital link using MATLAB

Registrar
Chandigarh University
Gharuan, Mohali-140413

Subject Code- ECP 309	Linear Integrated Circuits Lab	L	T	P	C
	Total Contact Hours: 24	-	-	2	1
	Applicable to which branch: ECE				
	Pre-requisite: Analog Electronic Circuits				

Course Objective

1. The main aim of this lab is to teach the linear and non-linear applications of operational amplifiers (741). Students are made familiar with applications of 555 timers.

2. To use MultiSim software for circuit design.

	Course Outcome
	Students will be able to understand how to use:
1.	To implement various data structure and operations on them using C++.
2.	To implement various sorting and searching algorithms using C++.
3.	To implement the concept of stack , queue , tree and graphs for proper utilization of memory

ECY 315	E-Commerce	L	T	P	CR
	Total Contact Hours : 42	3	0	0	3
	Prerequisite: None				

Course Objective

This course provides a better understanding of the concepts of Electronic Commerce

	Course Outcomes
1	E-Commerce Framework, EDI
2	Security in E-Commerce
3	Intelligent Agents

SEMESTER VII

Subject Code ECT 402	Name of the subject : Data communication and Computer networks	L	T	P	C
	Total Contact Hours -42	3	0	0	3
	Applicable to which branch: ECE				
	Prerequisite- Knowledge of analog and digital Communication				

Course Objective

1.Analyze the structure of a network and components of a network.

2.Understand the role of protocols in network communications and advantages of using a layered network model

3.Understand the role of each layer in the OSI and TCP/IP models. Explain the addressing and naming schemes used in network communications

	Course Outcome
1.	To understand computer networks, it's components & types
2.	To understand and Compare models, signals, multiplexing, switching & transmission media
3.	Be familiar with the components required to build different types of networks

ECP- 406	Wireless & Mobile Communication lab	L	T	P	C
	Total Contact Hours: 24	0	0	2	1
	Applicable to which branch ECE				
	Prerequisite: Analog & Digital Communication				

Course Objective

To introduce the students to the field of radio network planning and optimization. It would give them hands-on experience through a set of experiments using state-of-the-art radio network planning tools and drive testing equipment and software. It would also give them an understanding of practical wireless communication systems.

	Course Outcome
1.	To reinforce the programming skills by implementing practical systems.
2.	To enable students to implement their own systems for research.
3.	To facilitate the student with in depth knowledge of Wireless Communication.

ECA–412	Digital Image Processing with MATLAB	L	T	P	C
	Total Contact Hours – 48 Hours	0	0	6	3.0
	Applicable to ECE				
	Pre-requisites: None				

Marks

Internal 60	External (Departmental Committee) 40

Course Objective

To understand the perception of images, application and implementation of various operations to images.

Unit	Course Outcome
1.	Students will be able to understand the stochastic representation of images and image enhancement operations
2.	Students will be able to understand the perception and transformation of images.
3.	Students will be able to implement various filtering and segmentation techniques using Matlab.

ECB 413	Optical Fiber Communication	L	T	P	C
	Total Contact Hours 42	3	0	0	3
	Applicable to ECE				
	Prerequisite : Digital Communications, Electronic Devices & Circuits				

Course Objective

To expose the students to the basics of signal propagation through optical fibers, fiber impairments, components and devices and system design.

Registrar
Chandigarh University
Gharuan, Mohali-140413

	Course Outcome
1.	To gain basic knowledge about optical communication
2.	To enable the students to analyze and design optical communication systems.
3.	To equip the student with tools to confront continual communication system design challenges

ECB 416	Information Theory & Coding	L	T	P	C
	Total Contact Hours 42	3	0	0	3
	Applicable to ECE				
	Prerequisite : Digital Communications, Analog Communications				

Course Objective
Understand the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
Understand the real life applications based on the fundamental theory.

	Course Outcome
1.	To facilitate the student with the understanding on application of error control coding in digital communication system
2.	To emphasize the role of FEC strategies in digital transmission
3.	To equip the student with tools to confront continual communication system design challenges

ECC-418	Digital VLSI Design	L	T	P	C
	Total Contact Hours – 42	3	0	0	3
	Applicable to ECE				
	Pre-requisites: Basic Electronics, Digital Electronics				

Course Objective
To highlight the circuit design issues in the context of VLSI technology.
It offers a profound understanding of the design of complex digital VLSI circuits

	Course Outcome
1.	Ability to design the circuits using MOSFETs.
2.	To facilitate the student with concepts of static & dynamic logic circuits.
3.	To understand designing of different Memories.

ECC-419	VLSI Design and Synthesis with Verilog	L	T	P	C
	Total Contact Hours – 48 Hours	3	0	0	3
	Applicable to ECE				
	Pre-requisites: Basic Electronics, Digital Electronics				

Course Objective

Registrar
Chandigarh University
Gharuan, Mohali-140413

To introduce basic of HDL design and train in students in digital design. To study the concept of state machine and their issues. To introduce the backend design detailed concepts.	
	Course Outcome
1.	Ability to design digital systems using HDL languages.
2.	Ability to analyze the state machine and their issues.
3.	To understand the backend design detailed concepts.

Registrar
Chandigarh University
Gharuan, Mohali-140413