Integral University, Lucknow

Effective from Session:							
Course Code	DEC-601	**Title of the Course**	Advanced Microprocessor & Microcontroller	**L**	**T**	**P**	**C**
Year	3rd	**Semester**	6th	**3**	**1**	**0**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	To understand the basics of Microprocessor. To understand the Assembly Programming. Study how to interfacing devices. To understand the Embedded Technology.						

Course Outcomes	
CO1	Describe the architecture of advanced Microprocessor and introduction of microcontroller.
CO2	Identify a detailed s/w & h/w structure of the Microcontroller.
CO3	Assembling and running an 8051 Program using different instructions.
CO4	Design and implement 8051 microcontroller-based systems.
CO5	Design Electronic circuitry to the Microprocessor I/O ports in order to interface the processor to external devices..

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
I	Introduction to 8086 Microprocessor	Introduction to 8086 Microprocessor: Features, Architecture of 8086, Flag Register of 8086, Register Organization, Difference between 8085 & 8086, Introduction to Microcontroller, Difference between Microprocessor & Microcontroller	8	1
II	Introduction to 8051 Microcontroller	Introduction to 8051 Microcontroller: Features, Block diagram of 8051, Comparison of 8051 family members, 8051 Registers, Addressing modes of 8051, Program counter and ROM space in the 8051, ROM memory map in 8051 family.	8	2
III	8051 Instructions	Introduction to 8051Assembly Programming, Structure of Assembly language, Assembling and running an 8051 Program, 8051 data types and directives, 8051 Flag bits and the PSW register, MOV instruction and ADD instructions. Programs related to MOV and ADD instruction.	8	3
IV	8051 Architecture	Register Banks in the 8051, RAM memory space allocation in the 8051, Stack in the 8051, Pushing onto the stack, popping from the stack, LOOP and JUMP instructions, CALL instruction, 8051 Pin diagram and description of each pin.	8	4
V	Programs	8051 Special Function Register (SFR) and their addresses, Bit addresses for I/O and RAM, 8051 I/O programming, Single bit instructions, Arithmetic, Logic instructions and Programs.	8	5

References Books:

1. The 8051 Microcontroller and Embedded Systems: Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, "Pearson Prentice Hall"
2. Microprocessor & Application: B. Ram, TMH Publication.
3. Microprocessor and Interference: D V Hall, TMH Publication.

e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1		2											1				
CO2		2													2		
CO3			3	1											1		
CO4		2	3	3									1		1		
CO5		3	1										2				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-602	**Title of the Course**	Linear Integrated Circuit	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Sixth	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	To introduce the basics of ICs, including op-amp properties and applications, active filters, A-D & D-A conversion techniques, and the 555 timer and PLL.						

Course Outcomes	
CO1	Acquire the fundamental knowledge of Integrated circuits and their applications.
CO2	Develop analytical capability in analyzing signal generation, signal amplification, signal conditioning and signal processing applications of analog integrated circuit packages.
CO3	Design and analyze various signals using linear and non-linear application of Op-amps.
CO4	Acquire skills to develop simple filter circuits and various amplifiers and can solve problems related to it.
CO5	Illustrate the function of application specific ICs such as Voltage regulators, PLL and its application in electronic circuits.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Introduction to ICs	Advantages of ICs over discrete components, Classification of ICs, Integrated circuit chip size and levels of integration, Fundamentals of monolithic IC Technology. Ideal op-amp characteristics, CMRR, PSRR and slew rate.	8	1
2	Linear & Non-Linear Application of Op-amp	Linear Application of Op-amp: - Differential amplifier, inverting amplifier and non-Inverting amplifier, voltage follower, differentiator, integrator, scaling amplifier, adder and subtractor. Non-linear Application of Op-amp: Comparators, Schmitt Trigger, Converters, Sample/Hold Circuit, V to I and I to V converter.	8	2
3	Active Filter	Active Filter: Introduction, RC active Filters - First order Low Pass Filter, Second order Active Filter, High Pass Active Filter, Band Pass Filter (Narrow Band & Wide Band Pass Filter), Band Reject Filter and All Pass Filter.	8	3
4	D-A and A-D Converters	D-A Converter: Introduction, Basic DAC Techniques, Weighted Resistor DAC, R-2R Ladder DAC, Inverted R-2R Ladder. A-D Converter: - Parallel Comparator A/D Converter, the Counter Type A/D Converter, Servo Tracking A/D Converter.	8	4
5	Timers and PLL	Timers: Introduction, functional block diagram of timer, 555 timer- operation modes astable and mono, pin configuration, 555 as wave generator. PLL: Basics of PLL, functional block diagram and its application.	8	5

References Books:

1. Linear Integrated Circuits: D Roy Chaudhry and Shail B Jain, New Age International Publisher-II-edition-2004
2. Integrated Circuits: KR Botkar, Khanna publisher.
3. Operational Amplifier & linear integrated circuit: Ramakant A Gaykward, Prentice Hall.
4. Linear Integrated Circuit: Salivahanan, TMH.

e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1		2		3	1								2		1	3	3
CO2		2		2	1						3					1	
CO3	1		3	2	2										2		
CO4		2	2		2								2				3
CO5		2		3	1											2	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-603	**Title of the Course**	Wireless & Mobile Communication	**L**	**T**	**P**	**C**
Year	VI	**Semester**	III	**3**	**1**	**0**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After completation of the course student will be able to define GSM and CDMA, understand what are cyber-attack and its security mechanism.						

Course Outcomes	
CO1	Explain different wireless communication systems and their components.
CO2	Explain the component of mobile communication.
CO3	Explain different wireless communication systems and their components.
CO4	Explain the structure if of GSM and CDMA.
CO5	Explain the different cyber-attack and various security mechanisms taken to prevent it.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
1	Introduction to wireless Communication	Introduction to wireless and mobile communication. Review of TDMA, FDMA. Brief introduction Generation of mobile (1G/2G/3G/4G). Familiar to basic terms like Base station, handoff, MSC, Co-channel Interference, Forward Channel and Reverse channel.	8	1
2	Cellular System	Introduction, Cellular concepts, Frequency reuse, channel assignment strategies, Paging, handoff strategies (soft and hard handover), interference and system capacity, improving coverage and capacity in cellular systems (Cell Splitting, Sectoring, Microcell Concept).	8	2
3	GSM system	GSM system: Services and features, System Architecture, Radio Sub system Channel types. CDMA Digital Cellular Standard: Frequency and Channel specifications, Forward CDMA channel and reverse CDMA channel. UMTS/IMT2000-System architecture and handoff.	8	3
4	MOBILE IP	MOBILE IP-Goal, Requirement, Entities and Terminology, IP packet delivery, agent Discovery, Registration, Optimization, Tunneling and Reverse Tunneling. Bluetooth, ATM, NFC, Paging (basic Characteristic only)	8	4
5	Cryptography	Introduction to Cryptography. Security Attacks. Security Mechanism, Steganography, Introduction to DES and AES (basic only). Substitution Technique: Caesar, Mon alphabetic, Play fair, Hill Cipher.	8	5

References Books:

1. Wireless Communication Principles and Practices: Theodore S. Rappaport Pearson Publication.
2. Mobile Communications: JOCHEN SCHILLER, Pearson Education.
3. Introduction to Cryptography: William Stabling, Prentice Hall Publication

e-Learning Source:

www.nptel.com

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	1	2	2	-	1	-	-
CO2	2	-	-	-	2	2	1	-	-	-	1
CO3	2	-	-	-	3	2	2	-	2	2	-
CO4	2	-	-	-		3	3	-	-	-	-
CO5	-	-	-	-	-	1	-	-			

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session:

Integral University, Lucknow

Course Code	DEC-604	Title of the Course	Programmable Logic Controller	L	T	P	C
Year	III	Semester	VI	3	1	0	
Pre-Requisite		Co-requisite					
Course Objectives	After completation of the course student will be able to under the internal architecture of the PLC as well as be able to operate the PLC. They will also be able to program PLC						

Course Outcomes

CO1	Understand the need and importance of industrial automation.
CO2	Understand the basics of digital electronics.
CO3	Code different programs in ladder logic
CO4	Know about the different programming techniques.
CO5	Code different plant level programs

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Design & Operational Characteristics	PLC– Controllers, Microprocessor Controlled system, PLC, Hardware, Internal architecture, CPU, Buses control, Hardware, Internal architecture and PLC systems. Input Output Devices- Input Devices, Output Devices and Example of Applications.	8	1
2	PLC information & Communicatio n Techniques	Binary arithmetic and PLC data.I/O Processing- I/O Units, Signal Conditioning, Remote connections, Networks, Processing inputs and I/O addresses.	8	2
3	Programming Methods	Ladder And Functional Block Programming- Ladder diagram, logic function, latching multiple o/p, Entering programs, Function blocks and program.IL SFC & ST programming methods- Instruction list, Sequential function chart and structured text.	8	3
4	Programming Techniques	Internal relays (ladder programs, battery backed relays, one shot operation set & reset, master control relay), Jump & call (jump, subroutines), Timers (type of timers. Programming timers, off delay timers, pulse timers), Counters (forms of counter, programming, up & down counting, timer with counter sequencing), Shift registers and data handling.	8	4
5	Designing Systems& Program	Program Development: - flow charts & pseudo-codes, Safe Systems:- PLC Systems & safety, Emergency Stop Relays, Safety PLCs, Commissioning:- Testing Inputs & Outputs, Testing Software, Simulation, Fault Finding:- Fault Detection Techniques, Program storage, System Documentation. Programs: -Temperature control, valve sequencing & conveyor belt control.	8	5

References Books:

1.Programmable logic controller: W Bolton, Elsevier Publication

2. Programmable logic controller basic level, Festo Publication.

3.PLC programming for industrial automation: Kevin Collins

e-Learning Source:

www.nptel.com

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	-	-	-	3	-	-	-	-
CO2	1	-	-	-	2	-	-	-	1	-	-
CO3	-	-	-	-	-	-	3	-	-	2	-
CO4	-	-	-	-	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	2	-	-	-	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2010-11							
Course Code	DIM-601	**Title of the Course**	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**40**
Pre-Requisite	10^{th}	**Co-requisite**					
Course Objectives	The course Industrial Management and Entrepreneurship Development prepares Diploma in Automobile Engineering students with essential management and entrepreneurial skills. It covers key management principles like planning, organizing, and control, while enhancing leadership, communication, and motivation techniques. Students learn human resource development, industrial relations, labor welfare, and financial management, including wage administration and costing. Material management concepts such as inventory control and procurement are addressed, alongside industrial laws like the Factory Act and taxation policies. The course also highlights entrepreneurship, project report preparation, and intellectual property rights, equipping students for leadership roles and entrepreneurial opportunities in the automobile industry.						

Course Outcomes	
CO1	The course will increase the skills in the students like communication skills, presentation, Human skills, Leadership skills, Managerial skills etc. after the completion of the course.
CO2	Increase students' capabilities and confidence to handle administrative, managerial and financial activities.
CO3	The course will assist in developing intellectual skills like creative thinking, Decision making, Leadership, Brain Storming, Motivation, etc.
CO4	The course will introduce skills in the students like team work, leadership skills, communication skills, body languages, positive attitude, etc.
CO5	This course is designed to develop understanding of various functions of management, role of workers and engineers and providing knowledge ab

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
UNIT-I	Principles Of Management	Definition of management, Administration organisation, Functions management, Planning, Organizing, Co- ordination and control, Structure and function of industrial organisations, Leadership- Need for leadership, Factors to be considered for accomplishing effective leadership, Communication -Importance, Processes, Barriers to communication, Making communication, Effective, formal and informal communication, Motivation - Factors determining motivation, Positive and negative motivation, Methods for improving motivation, Incentives, Pay promotion and rewards, Controlling - Just in time, Total quality management, Quality circle, Zero defect concept. Concept of Stress Management.	**08**	**CO1**
UNIT-II	Human Resource Development And Human And Industrial Relations	Introduction, Staff development and career development, Training strategies and methods. Human relations and performance in organisation, Understand self and others for effective behaviour, Industrial relation and disputes, Characteristics of group behaviour and Trade unionism, Mob psychology, Labour welfare, Workers participation in management.	**08**	**CO2**
UNIT-III	Personnel And Financial Management	Responsibilities of human resource management - Policies and functions, Selection - Mode of selection - Procedure- training of workers, Job evaluation and Merit rating - Objectives and importance wage and salary administration - Classification of wage, Payment schemes, Components of wage, Wage fixation. Fixed and working capital - resource of capital, Shares, types preference and equity shares, Debenture types, Public deposits, Factory costing, Direct cost, Indirect cost, Factory over head, Fixation of selling price of product, Depreciation- Causes, Methods.	**08**	**CO3**
UNIT-IV	Material Management, Labour, Industrial And Tax Laws	Objective of a good stock control system - ABC analysis of inventory, Procurement and consumption cycle, Reorder level, Lead time, Economic order quantity, Purchasing procedure, Stock keeping, Bin card. Importance and necessity of industrial legislation, Types of labour laws and dispute, Factory Act 1948, Payment of Wages Act 1947, Employee State Insurance Act 1948, Various types of taxes - Production Tax, Local Tax, Trade tax, Excise duty, Income Tax.	**08**	**CO4**
UNIT-V	Entrepreneurship Development And Intellectual Property Rights :	Concept of entrepreneurship, need of entrepreneurship in context of prevailing employment conditions of the country. Successful entrepreneurship and training for entrepreneurship development. Idea of project report preparation. Introduction to IPR (Patents, Copy Right, Trade Mark), Protection of undisclosed information, Concept and history of patents, Indian and International Patents Acts and Rules, Patentable and No patentable invention including product versus Process.	**08**	**CO5**

Integral University, Lucknow

References Books:
Industrial Management And Entrepreneurship Development by Dr. Mohd. Shuaib Siddiqui
e-Learning Source:
https://www.youtube.com/watch?v=kqY4m059zFk&list=PLY8pCdWSlXrSNy8EBIQ9vclPRtd0qmpNo
https://www.youtube.com/watch?v=Jq_BeC-gMEk&list=PL0x1u9aMwXImXW1J5Z7wfH2uwQW9ZgK83

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	-	-	-	-	1	-	-	-	1	-	-	-	-
CO2	-	-	3	-	1	-	-	-	1	-	-	-	-
CO3	-	3	-	-	-	-	-	-	1	1	-	-	-
CO4	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	2	2	-	2	-	-	-	2	-	1	-	-	-
CO6	-	1	-	3	-	-	-	3	-	-	2	-	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-651	**Title of the Course**	Microcontroller & PLC Lab	**L**	**T**	**P**	**C**
Year	3rd	**Semester**	6th	**0**	**0**	**3**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	1. To understand the basics of Microcontroller. 2. To understand the Assembly Programming. 3. Study how to interfacing devices. 4. . To understand the Embedded Technology						

Course Outcomes	
CO1	To provide practical hands-on experience with Assembly Language Programming.
CO2	To familiarize the students with interfacing of various peripheral devices with 8051 Microcontroller.
CO3	To become familiar with the Instruction set of Intel 8051 Microcontroller.
CO4	To provide practical hands-on PLC & automation.

Exp No.	**Title of the Experiment**	**Content of the Unit**	**Contact Hrs.**	**Mapped CO**
1	8051 Programs	Write a program for hexadecimal addition and subtraction of two numbers	3	1
2	8051 Programs	Write a program for hexadecimal multiplication of two numbers.	3	1
3	8051 Programs	Write a program for hexadecimal division of two numbers.	3	1
4	8051 Programs	Write a program for Fibonacci series calculation.	3	1
5	8051 Programs	Write a program for basic logical gates.	3	2
6	8051 Programs	Write a program for universal gates.	3	2
7	8051 Programs	Write a program for XOR gate.	3	2
8	8051 Programs	Write a program to find even and odd numbers	3	3
9	PLC Programs	Write a Ladder Logic program for all basic gates using PLC.	3	4
10	PLC Programs	Write a PLC program to implement the conditional logic statements (a), and (b) below. (a) A PLC output is to switch on if the three inputs connected in parallel are switched on. (b) A PLC output is to switch on if any *one* of three inputs (connected in parallel) is switched on but not two or more.	3	4

References Books:
1.
2.
3.
e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1		2											1			
CO2		2	3	1											2	
CO3			3	3											1	
CO4		2	1										1		1	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-652	**Title of the Course**	Linear Integrated Circuit Lab	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Sixth	**0**	**0**	**3**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	To introduce the basics of ICs, including op-amp properties and applications, active filters, A-D & D-A conversion techniques, and the 555 timer and PLL.						

Course Outcomes	
CO1	Design and analyze the various linear and non-linear application of op-amp.
CO2	Design and analyze filter circuits using op-amp.
CO3	Design and analyze oscillators, multi vibrator and application of 555 timer circuits using op-amp.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment-1	To study Op-amp as Inverting and Non inverting amplifiers.	03	1
2	Experiment-2	To study Op-amp as Differential amplifiers.	03	1
3	Experiment-3	To study Op-amp as Integrator.	03	1
4	Experiment-4	To study Op-amp as Differentiator.	03	1
5	Experiment-5	To study Op-amp as Instrumentation amplifier.	03	1
6	Experiment-6	To study Op-amp Active low-pass, high-pass and band-pass filters.	03	2
7	Experiment-7	To study Astable & Mono-stable multi-vibrators and Schmitt Trigger using op-amp.	03	3
8	Experiment-8	To study Phase shift and Wien bridge oscillators using op-amp.	03	3
9	Experiment-9	To study Astable and mono-stable multi-vibrator using NE555 Timer.	03	3
10	Experiment-10	To study the PLL characteristics and its use as Frequency Multiplier.	03	3
References Books:				
e-Learning Source:				

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	3	2													
CO2	2	3	2													
CO3	1	2														
CO4																
CO5																

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-653	**Title of the Course**	**Wireless & Mobile Communication Lab**	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**0**	**0**	**3**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After completation of the lab student will be able to know the what is GSM AND CDMA,as well know how to PC communicate.						

Course Outcomes	
CO1	Identify the issues and challenges in the architecture of a computer network.
CO2	Understand the network synchronization and management.
CO3	Identify hardware and software components of a P.C. related to Networking.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment-1	Design and Study of Star topology using 100Base-Tx	3	1
2	Experiment-2	Design and Study of Bus topology using 10Base-2	3	1
3	Experiment-3	To Study PC to PC communication with IEEE 802.3 standard	3	1
4	Experiment-4	Study of Various LAN Protocols used in data communication	3	1
5	Experiment-5	Study of wireless LAN	3	1
6	Experiment-6	Study of signals in GSM network	3	1
7	Experiment-7	Study of network protocols like TCP/IP, HTTP, FTP and SMTP	3	1
8	Experiment-8	Study of GSM network by actually connecting to the GSM environment by any service provider.	3	2
9	Experiment-9	To understand operation on dual band frequency network (GSM 900/ DCS 1800)	3	2
10	Experiment-10	Study of all sections in Dual SIM mobile phone.	3	3

References Books:

e-Learning Source:

www.vlab.com

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	2	-	-	-	-	2	-	1	-	-
CO2	1	2		-	-	-	-	-	-	-	-
CO3	1	2	1	-	-	-	-	-	-	-	1

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**