Semester - I							
GEA		Generic Elective (Allied)	L	T	P	C	H/W
Course Code:	23BELA1	Computer Electronics - I		T		3	3
Objectives							
Unit - I	**Minimization Techniques:** Number Systems – Floating Point Representation – 1's and 2's Complements – Signed number Addition and Subtraction – Codes – Boolean Algebra – Demorgan's Theorem – Canonical and Standard Forms – Minimization Techniques – Simplification of Boolean Functions using Karnaugh Map.						
Unit - II	**Combinational Logic Design:** Logic Gates – Universal Gates – Half Adder – Full Adder – Half Subtractor – Full Subtractor – Parallel Binary Adder and Subtractor (7483) – BCD Adder – Binary Multiplier and Divider – Multiplexers – De multiplexers –(74138) 3 to 8 Decoder – 74148 Priority Encoder – BCD to Seven Segment Decoder 7447/48 – Parity Generator and Checkers .						
Unit-III	**Flip-Flops:** Basic Latch circuits – S-R Flip-Flop – D Flip-Flop – J-K Flip-Flop – T Flip-Flop – Triggering of Flip-Flops – Asynchronous Inputs in Flip-Flops – Master Slave J-K Flip Flops – Racing Condition .						
Unit-IV	**Registers:** 4- bit Shift Register – SISO Shift Register – SIPO Shift Register – PISO Shift Register – PIPO Shift Register.						
Unit-V	**Counters : Asynchronous Counters**: Ripple Counter – Decade Counter – Up/ Down Counter **Synchronous Counters:** Up/Down Counter – Design of MOD- n Counters – BCD Decade Counter.						

Text Book:

1. Digital Electronics, S.Salivahanan, S.Arivazhagan, Vikas Publishing -2012

Books for Reference:

1. Digital Design - M. Morris Mano - Pearson Education (3rd Edition)
2. Digital Principles – Leach, Malvino, TMH (6th Edition).
3. Fundamental of Digital Circuits- Anand Kumar- Prentice Hall of India Pvt. Ltd.
4. Digital Electronics – Dr. R. S. Sedha – S. Chand Publications.(3rd Revised Edition).

Semester - I							
GEA		Generic Elective Allied Lab -	L	T	P	C	H/W
Course Code:	23BELAP1	Computer Electronics – I Lab			P	2	2
Objectives							

1. Logic Gates Using IC's and verify its truth table
2. Design Logic gates using Universal NAND gate and verify its truth table.
3. Design Logic gates using Universal NOR gate and verify its truth table.
4.. Design and Implementation of Code conversion using logic gates
5. Implementation of SOP and POS logical functions using universal gates.
6. Implementation of Half Adder and Full Adder using logic gates.
7. Implementation of Half Subtractor and Full Subtractor using Logic Gates
8. Implementation of Binary Adder and Subtractor using IC7483
9. Verification of Functionality of Multiplexer
10. Verification of Functionality of De multiplexer
11. Verification of functionality of Decoder.
12. Verification of functionality of Encoder.
13. Verification of the functionality of BCD to Seven segment decoder/driver.
14. Verification of functionality of Parity Generator and Checker
15. Implement S-R, D, J-K, T flip flops using logic Gates/IC's
16. Functional verification of universal shift registers using IC 7495.
17. Design and implementation of Ring counter using shift register.
18. Design and Implementation of 4 Bit Ripple counter
19. BCD Decade Counter
20. Mod Counter

<table>
<tr><td colspan="8">Semester - II</td></tr>
<tr><td colspan="2">GEA</td><td>Generic Elective Allied</td><td>L</td><td>T</td><td>P</td><td>C</td><td>H/W</td></tr>
<tr><td>Course Code: 23BELA2</td><td>123</td><td>Computer Electronics – II</td><td></td><td>T</td><td></td><td>3</td><td>3</td></tr>
<tr><td>Objectives</td><td colspan="7">➢ Acquire knowledge of Embedded hardware
➢ Programming 89C51 using embedded C
➢ Acquire Data transmission using embedded system
➢ Acquire design knowledge of an embedded system</td></tr>
<tr><td>Unit - I</td><td colspan="7">Microcontroller architecture: Introduction - Features of 8051 - Pin details of 8051 - 8051 Architecture - Oscillator and clocks - Program Counter - Stack and Stack Pointer - Data Pointer - A and B Registers - Bank Registers - Flags and PSW-Internal RAM - Special Function Registers.</td></tr>
<tr><td>Unit - II</td><td colspan="7">Embedded C : Structure of Embedded C - Constants and Variables - Assignment Statements- conditional Statements - Looping Statements - User Defined functions.</td></tr>
<tr><td>Unit III</td><td colspan="7">Programming Parallel I/O Ports: Port 0 - Port 1- Port2-Port 3 - I/O Port Programming - I/O bit Manipulation Programming- PWM - Interrupts</td></tr>
<tr><td>Unit IV</td><td colspan="7">Serial communication Mode - Timer 0 and Timer 1 Programming - Basic of serial communication - 8051 Connection to RS232 - 8051 serial Port Programming.</td></tr>
<tr><td>Unit - V</td><td colspan="7">LED Interfacing - Seven Segment Interfacing - LCD Interfacing - DIP interfacing - Hex Key Board Interfacing - Stepper Motor Interfacing - Traffic Light Interfacing - DC Motor Interfacing</td></tr>
<tr><td></td><td colspan="7">Text Books:
1. The 8051 Microcontroller Architecture, Programming and Applications, Kenneth J. Ayala – Penram International Publication, Second Edition -2004.
2. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mohammed Ali Maszidi, Prentice Hall of India, Second Edition-2006.
McGraw-Hill (2006)</td></tr>
<tr><td>Outcomes</td><td colspan="7">➢ Skill will be developed on embedded system design and it will useful of IOT.</td></tr>
</table>

Semester - II							
GEA		Generic Elective Allied - II	L	T	P	C	H/W
Course Code: 23BELAP2	123	Computer Electronics – II -Lab			P	2	2
Objectives	➢ Design Embedded system modules for applications						
	1. BCD to ASCII and ASCII to BCD. 2. Decimal to Hexa and Hexa to Decimal. 3. Addition and Subtraction 4. Multiplication and Division 5. Interfacing 8 bit LED 6. Interfacing LCD 7. Interfacing with DIP switches and LED 8. Interfacing with Seven Segment LED 9. Interfacing with Traffic Light controller. 10. Interfacing with Stepper Motor 11. Interfacing with DC Motor speed control 12. Interfacing with HEX Keyboard						
Outcomes	➢ Skill will be developed to interface and design embedded system.						

Semester - III							
GEA		Generic Elective Allied - III	L	T	P	C	H/W
Course Code: 23BELA3		**MICROPROCESSOR PROGRAMMING**		T		3	3
Objectives	➢ To study the internal architecture of the microprocessors ➢ To study the assembly language programming ➢ To learn the interfacing techniques						
Unit - I	8085 Architecture : Pin Description - 8085 Architecture - Bus Organization - De-multiplexing AD0-AD7 address and data bus - Generation of control signals. Memory Mapped I/O - I/O Mapped I/O						
Unit - II	8085 Programming : Programming Model - Addressing Modes - Instruction Sets - Programming Techniques - Simple Programs.						
Unit-III	I/O Interfacing: Basic interfacing Concept - Programmable I/O 8255 - Interfacing LED - interfacing Seven Segment Display - Interfacing LCD - Interfacing Stepper Motor.						
Unit - IV	8086 Architecture: Pin Description for Minimum Mode - Pin description for Maximum Mode - Register Organization of 8086 - BIU - EU - External Memory Addressing - Minimum Mode Bus Cycle -Minimum Mode System Configuration.						
Unit - V	8086 Programming: Addressing Modes -Instruction Set - Data Transfer Group - Control Transfer Group - Arithmetic Group - Logical Group - Miscellaneous Instruction Groups- Simple Programs.						

Text Books:

1. Microprocessor Architecture, programming and Applications with the 8085, Ramesh S. Goanker, Penram International Publishing, 5th Edition(Units I,II,and III)
2. Advanced Microprocessors and Interfacing, Badri Ram, Tata McGraw Hill,2008 (Unit IV and V)
3. Microprocessors and Microcontrollers Architecture,Programming and System Design 8085,8086,8051,8096, Krishna Kant, PHI learning Pvt.Ltd -2013(Unit IV and V).

Outcomes	➢ Skill developed to service the computer hardware

Semester - III							
GEA		Generic Elective Allied Lab - III	L	T	P	C	H/W
Course Code: 23BELAP3	123	**MICROPROCESSOR AND INTERFACING LAB**			P	2	2
Objectives	➢ To develop assembly language programming and interfacing techniques with microprocessor.						
	1. 8 bit and 16 bit addition using 8085/8086 2. 8bit and 16 bit subtraction using 8085/8086 3. 8bit Multiplication using 8085/8086 4. Logical Operations using 8085/8086 5. Block of Data Transfer using 8085/8086 6. 8 bit LED interfacing using 8085/8086 7. 8 bit DIP Interfacing using 8085/8086 8. Traffic Controller Interfacing using 8085/8086 9. Seven Segment Interfacing using 8085/8086 10. LCD interfacing using 8085/8086 11. Stepper Motor Interfacing using 8085/8086 12. DC Motor Interfacing using 8085/8086						
Outcomes	➢ Skill will be developed to trouble shoot the computer.						

Semester - IV							
CC/DSE/NME		Generic Elective Allied - IV	L	T	P	C	H/W
Course Code: 23BELA4		**ANALOG AND DIGITAL COMMUNICATION ELECTRONICS**		T		3	3
Objectives	➢ To learn analog devices and wave form generation ➢ To study the analog and digital modulation and demodulation techniques.						
Unit - I	**Operational Amplifiers:** IC 741 Op-Amp Terminals – Power Supply Connections – Negative Feed Back – Voltage Follower - Inverting Amplifier – Non inverting Amplifier – Inverting Summing Amplifier – Non inverting Summing Amplifier – Differential Amplifier – Integrator – Differentiator - Sample and Hold Amplifier.						
Unit - II	**Comparators and Waveform Generators:** Comparator – Schmitt trigger – Phase Shift Oscillator – Wien Bridge Oscillator – Square Wave Generator (Astable Multivibrator) – Monostable Multivibrator.						
Unit-III	**555-TIMER and PLL :** 555 Timer Pin Details – Description of Functional Block Diagram – Monostable Operation – Astable Operation – Pulse Position Modulator – Schmitt Trigger – Basic Principles of PLL – IC PLL 565 – Frequency Multiplication/Division						
Unit - IV	Analog and Optical Communication: Electronic Communication System-AM Modulation and Demodulation - FM Modulation and Demodulation - PAM - PWM - AM Transmitter and Receiver block diagram - Optical Communication system Block Diagram.						
Unit - V	Digital Communication: Block diagram of digital transmission and reception- Information capacity, Bit Rate, Baud Rate and M-ary coding- Amplitude Shift Keying (ASK)- Frequency Shift Keying (FSK)-Phase Shift Keying (PSK)- Binary Phase Shift Keying (BPSK) - Quadrature Phase Shift Keying (QPSK)						
Text Book: 1.Linear Integrated Circuits, D.Roy Choudhury, Shail B. Jain, New Age International Publishers, Fourth Edition – 2010. **2.** Electronic communication - Roddy and Coolen ,PHI							
Outcomes	➢ It gives the knowledge to study computer communication						

Semester - IV							
CC/DSE/NME		Allied Practical - IV	L	T	P	C	H/W
Course Code: 23BELAP4	123	**ANALOG AND DIGITAL COMMUNICATION ELECTRONICS LAB**			P	2	2
Objectives							
	1. Inverting and Inverting Summing Amplifier 2. Non Inverting and Non Inverting Summing Amplifier 3. Differential Amplifier 4. Differentiator and Integrator using OP-Amp 5. Construct Astable Multivibrator using 555 Timer 6. Construct Monostable Multivibrator using 555 Timer 7. Amplitude Modulation and Demodulation 8. Frequency Modulation and Demodulation 9. Pulse Amplitude Modulation 10. Pulse Width Modulation 11. Amplitude Shift Keying 12. Frequency Shift Keying						