

# **Government City College, Hyderabad**

**(Autonomous)**

## **Department of Electronics**



**Electronics Syllabus (CBCS) for the Academic Year**

**2017-18**

**GOVERNMENT CITY COLLEGE (A), HYDERABAD**

**DEPARTMENT OF ELECTRONICS : B.Sc. (Electronics)**

S.NO	NAME AND DISIGNATION	MEMBERS
1.	Dr.S.E.NainaVinodini Asst. Prof of Physics Governement City College,Hyderabad	Chairman,BOS Governement City College, Hyderabad
2.	Prof K.Sivakumar BOS Chairman (Electronics) Department of Physics Osmania University,Hyderabad	Member
3.	Prof.C.Vishnuvardhan Reddy Department of Physics Osmania University,Hyderabad	Member
4.	Prof J.Sivakumar Head :Department of Physics Osmania University,Hyderabad	Member
5.	Smt.V.Suhasini Lecturer in Physics Governement City College,Hyderabad	Member
6.	Sri.P.Poornachander Lecturer in Electronics Governement City College,Hyderabad	Member
7.	Ms. S.Swaroopa Lecturer in Electronics Governement City College,Hyderabad	Member
8.	Sri.V.Ramesh Kumar Lecturer in Electronics Sujatha Degree & P.G. College, Abids, Hyderabad	Member(Alumni)

**GOVERNMENT CITY COLLEGE (A)**  
**ALLOCATION OF CREDITS AT SUBJECT LEVEL**  
**SUBJECT: ELECTRONICS**

S.No	Semester	Code	Module	Hours per week	Max. Marks	Credits
1	I (Theory )	ELC1	Circuit analysis	4	100	03
	Practicals - I	ELCP1A	Circuit Analysis Lab	3	50	01
2	II (Theory )	ELC2	Electronic Devices	4	100	03
	Practicals - II	ELCP1B	Electronics Devices Lab	3	50	01
3	III (Theory )	ELC3	Analog Circuits	4	100	03
	Practicals - III	ELCP2A	Analog Circuits Lab	3	50	01
4	IV (Theory )	ELC4	Linear Integrated circuits and basics of Communication	4	100	03
	Practicals-IV	ELCP2B	Linear Integrated circuits and basics of Communication Lab	3	50	01
5	V (Theory )	ELC5	Digital Electronics	3	100	03
	Practicals-V	ELCP3A	Digital Electronics Lab	3	50	01
6	VII(Theory ) (Advanced elective-I)	ELE1A	The 8051 Microcontroller-I	3	100	02
	VII(Theory ) (Advanced elective-II)	ELE1B	Microprocessor 8086			
	Practicals-VII	ELEP3B	Microcontroller (8051) Lab	3	50	01
	Practicals-VII	ELEP3C	Microprocessor (8086) Lab			
7	VI (Theory)	ELC6	Microprocessor(8085)	3	100	03
	Practicals-VI	ELCP4A	Microprocessor (8085)Lab	3	50	01
8	VIII (Theory) (Applied elective-I)	ELE2A	The 8051 Microcontroller-II	3	100	02
	VI (Applied elective-II)	ELE2B	Digital system design using VHDL			
	Practicals -VI	ELEP4B	Embedded Systems and Applications Lab	3	50	01
	Practicals -VI	ELEP4C	VHDL Lab			
9	VI Project work		Self study and Skill based		Grade	02
						32

Note: For B.Sc II year (Sem-III & Sem-IV) Syllabus of Osmania University Shall be implemented in toto during the academic year 2017-18.

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**B.Sc I Year-ELECTRONICS**  
**Paper-I (ELC1)**

**Core-I**  
**Semester-I (Circuit analysis)**

**UNIT –I**

**AC Fundamentals:** The Sin wave-average and RMS values-The J operator-Polar and Rectangular forms of complex numbers - Phasor diagram - complex impedance and admittance.

**Kirchhoff's Current and Voltage Laws:** Concept of voltage and current sources –KVL and KCL- application to simple circuits (AC and DC) consisting of resistors and sources - Node Voltage analysis and mesh analysis.

**UNIT-II**

**Network Theorems (DC and AC):** Super position Theorem- Thevenin's Theorem – Norton's Theorem –Maximum power Transfer Theorem — Reciprocity Theorem Milliman Theorem Theorem. Application to simple Networks.

**UNIT-III**

**RC and RL Circuits:** Transient response of RL and RC circuits with step input –time Constants. Frequency response of RC and RL circuits, Types of filters- Low pass filter -High pass filter- Frequency response, passive differentiating circuit and integrating circuit.

**UNIT-IV**

**Resonance:** Series resonance and parallel resonance –resonant frequency-Q factor –band width – Selectivity.

**Cathode ray Oscilloscope (CRO):** cathode ray tube (CRT) and its working, electron gun focusing, deflection sensitivity, fluorescent screen. Measurement of time period, frequency, phase and amplitude.

**Reference Books:**

1. Basic Electronics- Grob 10<sup>th</sup> Edition (TMH)
2. Circuit analysis- P.Gnanaswam- Pearson Education
3. Circuits and Networks- A.Sudhakar & S. Pallri- (TMH)
4. Pulse, Digital and switching wave forms-Milliman & Taub
5. Network lines and fields- John Ryder- (PHI)
6. Network Theory- Smarajit Ghosh- (PHI)
7. Principles of Electronics- V.K. Mehta and Rohit Mehta- S Chand & Co.

**GOVERNMENT CITY COLLEGE, HYDERABAD**  
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**B.Sc I Year-ELECTRONICS**  
**Paper-II (ELC2)**

**Core-II**  
**Semester-II (Electronic Devices)**

**UNIT –I**

**PN Junction:** Formation of P-N junction, Depletion region, junction capacitance- Diode equation (no derivation)- Effect of temperature on reverse saturation current, V-I Characteristics and simple applications of i) Junction diode, ii) Zener diode, iii) Tunnel diode and iv) Varactor diode.

**UNIT –II**

**Bipolar Junction Transistor (BJT):** PNP and NPN transistors, current components in BJT, BJT static characteristics (Input and Output), Early effect, CB, CC, CE configurations of transistor and bias conditions (cut off, active and saturation regions) CE configuration as two port network, h- parameter model and its equivalent circuit. Determination of h- parameters from the characteristics. load line analysis (AC & DC), Transistor Biasing, Fixed bias and self bias.

**UNIT- III**

**Field Effect Transistor (FET):** Construction and working of JFET, output and transfer characteristics of FET, determination of FET parameters. Application of FET as voltage variable resistor. Advantage of FET over BJT. **MOSFET:** Construction and working of enhancement and depletion modes, output and transfer characteristics. Application of MOSFET as a switch.

**Uni Junction Transistor (UJT):** Construction and working of UJT and its characteristics. Application of UJT as a relaxation oscillator.

**UNIT - IV**

**Silicon Controlled Rectifier (SCR):** Construction and working of SCR. Two transistor representation, characteristics of SCR.

\*Experimental set up to study the SCR characteristics\*. Application of SCR for power control.

**Photo Electronic Devices:** Construction and characteristics of LDR, Photo voltaic cell, photo diode, photo transistors and LED.

**Reference Books:**

1. Electronics Devices and Circuits- Millman and Halkias- TMH
2. Principles of Electronics- V.K. Mehta and Rohit Mehta- S Chand & Co.
3. Electronic Devices and Circuits- Allen Moltershed- PHI
4. Basic Electronics and linear circuits –Bharghava U
5. Electronic Devices and Circuits-Y.N Bapat
6. Electronic Devices and Circuit Theory- Mithal
7. Experiments in Electronics –S.V.Subramanyam.

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**B.Sc I Year-ELECTRONICS (Semester- I & II)**

**PRACTICAL-I (ELCP1A)      (Circuit Analysis Lab)      (45 hours – 15 sessions)**

1. Thevenin's Theorem- Verification.
2. Norton's Theorem- Verification.
3. Maximum power transfer theorem- Verification.
4. CR and LR Circuits- Frequency response- (Low pass and High pass).
5. CR and LR circuits- Differentiation and integration- tracing of wave forms.
6. LCR- series resonance circuit- Frequency response- Determination of  $f_0$ , Q and band width.
7. Measurement of peak voltage, frequency using CRO.
8. Measurement of phase using CRO
- 9. Simulation**
  - i. Verification of KCL and KVL
  - ii. Study of Network theorems
  - iii. Study of frequency response (LR)

**Note: Students has to perform minimum of 06 Experiments**

Reference Books:

1. Lab Manual for Electronic devices and circuits-4<sup>th</sup> Edition. By David A Bell (PHI)
2. Basic Electronics- A Text Lab Manual- Zbar, Malvino, miller

1. To draw volt-ampere characteristics of junction diode and determine the cut-in voltage, forward and reverse resistances.
2. Zener diode V-I Characteristics- Determination of Zener breaks down voltage.
3. Voltage regulator (Line and Load) using Zener diode.
4. BJT input and output Characteristics (CE Configuration) and determination of 'h' parameters.
5. FET- Characteristics and determination of FET parameters.
6. UJT Characteristics- Determination of Intrinsic standoff ratio.
7. UJT as Relaxation Oscillator
8. Characteristics of LDR-Photo diode-Photo Transistor-Solar Cell
9. \*SCR Volt-ampere Characteristics\*.

**10. Note: Students has to perform minimum of 06 Experiments**

**Reference Books:**

Lab Manual for Electronic devices and circuits-4<sup>th</sup> Edition. By David A Bell (PHI

GOVERNMENT CITY COLLEGE, HYDERABAD  
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B.Sc I Year-ELECTRONICS  
Paper-III (ELC3)

Core-III  
Semester-III (Analog Circuits)

UNIT – I

**Rectifiers and filters:** Rectifiers– half wave, full wave and bridge rectifiers, Efficiency, Ripple factor, regulation, harmonic components in rectified output, **Filters** – choke input (inductor) filter, Shunt capacitor filter, L section and  $\pi$  section filters.

UNIT – II

**Regulated Power Supplies:** Block diagram of regulated power supply, Series and shunt transistor regulated power supplies, three terminal IC regulators (78XX and 79XX), Principle and working of switch mode power supply (SMPS). UPS –Principle and working.

UNIT – III

**Transistor amplifier:** Classification of amplifiers, Hybrid  $\pi$  model of a transistor, RC coupled amplifier – frequency response and analysis.

**Feedback in amplifiers:** Positive and negative feedback, Effect of negative feedback on gain, bandwidth, noise, input and output impedances. Emitter follower, Darlington pair and its advantages

UNIT – IV

**Oscillators:** Barkhausen criterion for sustained oscillations, RC oscillators- RC phase shift and Wien's bridge oscillators, LC oscillators- Hartley and Colpitt.

**Multi-vibrators:** Astable, Mono stable and Bi-stable multi-vibrators (Qualitative treatment using BJT's only)

**Reference Books:**

1. Electronic Devices and Circuits-Millman and Halkias (TMH)
2. Basic Electronics and linear circuits - Bhargava, Kulshreshta & Gupta TMH
3. A first course in Electronics-AA Khan and KK Dey-PHI
4. Electronic Devices and Circuit Theory-Robert L Boylestad& Louis Nashelsky
5. Pulse, Digital and Switching circuits by Milliman and Taub



Syllabus w.e.f.2017-18 onwards

**GOVERNMENT CITY COLLEGE, HYDERABAD  
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**B.Sc I Year-ELECTRONICS  
Paper-IV (ELC4)**

**Core-IV  
Semester-IV  
(Linear Integrated Circuits and Basics of Communication)**

**UNIT – I**

**Operational Amplifiers:** Emitter Coupled Differential amplifier, Block diagram of Opamp. Characteristics of Opamp, Opamp parameters-Input resistance, Output resistance, Common mode rejection ratio (CMMR), Slew rate, offset voltages, Input bias current, Basic Op-Amp circuits-Inverting Op-Amp, Virtual ground, Non-inverting Op-Amp, Frequency response of Op-Amp. Op Amp as: Summing amplifier, subtractor, Comparator, Voltage follower, Integrator, and Differentiator.

**UNIT- II**

**Applications of Op-Amps:** Logarithmic amplifier, Sine wave [Wien Bridge] generator and square wave [Astable] generator, Triangular wave generator, Mono stable multi-vibrator, Solving of simple second order differential equations. Basic Op-Amp series regulator and shunt regulator, IC 555 Timer [Block diagram and its working], IC 555 as mono stable and astable multi-vibrators.

**UNIT – III**

**Modulation:** Need for modulation-Types of modulation- Amplitude, Frequency and Phase modulation.  
**Amplitude modulation:** Analysis of Amplitude modulation, side bands, modulation index, AM modulator, Balanced modulator, Demodulation – diode detector.

**UNIT – IV**

**Frequency modulation:** Analysis of FM, Working of simple frequency modulator, - detection of FM waves – FM Discriminator. Advantages of frequency modulation. AM and FM Transmitters and radio receivers [block diagram approach]. Introduction to PAM, PPM, PWM, and PCM, Delta modulation.

**Reference Books:**

1. Op amps and linear Integrated Circuits – Ramakant Gayakwad, PHI
2. Linear Integrated Circuits- D Roy Choudhury and Shail B Jain
3. Electronic Communication Systems-George Kennedy & Bernard Davis
4. Principles of Electronic Communication Systems-Louis E Freznel, TMH

Syllabus w.e.f.2017-18 onwards

**GOVERNMENT CITY COLLEGE, HYDERABAD  
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**B.Sc II Year-ELECTRONICS ( Semester-III &IV)  
Analog Circuits Lab**

**Practical –I (ELCP2A)**

**( 45 Nours-15 Sessions)**

1. Study of HWR, FWR and bridge rectifier, determination of ripple factor.
2. Series inductor, shunt capacitor, L-section and  $\pi$ -section filters; determination of ripple factor using Full wave Rectifier.
3. Study of voltage regulator using IC's - 78XX & 79XX.
4. Colpitt oscillator – determination of frequency.
5. RC Phase shift oscillator- determination of frequency
6. Astable multi-vibrator – determination of time period and duty cycle.

**7. Simulation experiments :**

- i) Rectifiers
- ii) RC coupled amplifier
- iii) Wein bridge oscillator
- iv) Colpitt oscillator
- v) RC phase shift oscillator
- vi) Astable multi-vibrator

**Note: Student has to perform minimum of Six experiments**

- 1) Lab manual for Electronic Devices and Circuits – 4<sup>th</sup> Edition. By David A Bell – PHI
- 2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

## **Linear Integrated Circuits and Basics of Communication Lab**

**Practical –II (ELCP2B)**

**(45 Nours-15 Sessions)**

### **Practical :Using IC 741OpAmp and IC 555 Timer :**

1. Op amp as inverting Amplifier- determination of gain (with AC and DC ).
2. Op amp as non- inverting Amplifier- determination of gain( with AC and DC ).
3. OP Amp as Summing amplifier and comparator( Zero crossing detector)
4. Astable multi-vibrator – determination of time period and duty cycle.
5. Mono stable multi-vibrator- determination of gate width.
6. Integrator/ Differentiator – study of wave forms.
7. Astable multi-vibrator using IC 555
8. Mono stable multi-vibrator using IC 555.
9. AM modulator and detector
10. FM modulator and detector

### **Simulation of all the above experiments:**

1. Inverting and Non-inverting amplifiers and comparator
2. Integrator/ Differentiator using op amp
3. Wein bridge oscillator
4. Astable multi-vibrator using Op Amp
5. Astable multi-vibrator using IC 555

**Note: Student has to perform minimum of Six experiments**

- 1) Lab manual for Electronic Devices and Circuits – 4<sup>th</sup> Edition. By David A Bell – PHI
- 2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

**Syllabus w.e.f.2016-17 onwards**

**GOVERNMENT CITY COLLEGE, HYDERABAD  
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**B.Sc III Year – Electronics  
PAPER V : (ELC5)**

**Core- V  
Semester- V (Digital Electronics)**

**UNIT-I (16 H)**

- 1). Introduction to number systems, 1's and 2's Complement. Logic gates OR, AND, NOT, X-OR, NAND, NOR gates -Truth tables.
- 2). Universal building blocks NAND and NOR gates. Positive and negative logic - Logic families and their characteristics. RTL, DTL, ECL, TTL and CMOS.

**UNIT-II (16 H)**

- 1) .Boolean algebra - De Morgan's Theorems. Sum of products (SOP) and Product of sums (POS). Simplification of Boolean expressions - Boolean identities, Karnaugh Maps.
- 2). Combinational circuits: Multiplexer and De-Multiplexer. Decoder and Encoder Half adder, Full adder Parallel Binary adder and 2's Complement adder & Subtractor circuits.

**Unit-III (16)**

- 1) Flip flops - RS, D, JK and JK Master-Slave flip flops (working and truth tables).
- 2). Synchronous and asynchronous binary counters, Up/Down counters- Decade counter (7490 or 74093) working, truth tables and timing diagrams. Semiconductor memories - Organization and working.

**Reference Books:**

1. Digital Principles and Applications- Malvino & Leach- TMH
2. Modern Digital Electronics- R.P Jain-TMH
3. Digital Fundamentals. F.Loyd & Jain- Pearson Education
4. Modern Digital Electronics- R.P Jain-TMH
5. Fundamentals of Digital Circuits- Anand Kumar- PHI
6. Digital Systems . Rajkamal- Pearson Education
7. Digital Electronic Principles and Integrated Circuits- Maini- Willey India
8. Digital Electronics- Gothman-
9. Digital Electronics .J.W. Bignel & Robert Donova- Thomson Publishers (Indian 5th Ed)

GOVERNMENT CITY COLLEGE, HYDERABAD

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B.Sc III Year – Electronics

Adv.Elective-I

Paper VII (ELE1A)

V-semester (The 8051 Microcontroller-I)

UNIT. I (16 HOURS)

**1). Introduction to Microcontrollers:** Microcontrollers and Embedded processors, Overview and block diagram of 8051. Pin diagram of 8051.

**2).Architecture of 8051:** Registers, programcounter, Flag bits and PSW Register, Register banks, special function Registers (SFR) and Stack. Memory organization. Data types and directives.

UNIT.II (16 HOURS)

**1). Port organization:** Port0, Port1, Port2 and Port3 and their functions. I/O Programming, Bit manipulation. Interrupts and timer.

**2). Addressing modes:** Addressing modes and accessing memory using various addressing modes. **Instruction set:** Data transfer, Arithmetic, Logical, Single Bit, Jump, Loop and Call Instructions and their usage.

UNIT.III (16 HOURS)

1).Assembly language programming of 8051, Time Delay Generation and Calculation; Timer/Counter Programming.

2).**Programming examples:** Addition, multiplication, subtraction, division, arranging a given set of numbers in ascending / descending order, picking the smallest / largest number among a given set of numbers, Accessing a specified port terminal and generating a rectangular waveform.

**Reference Books:**

1. The 8051 Microcontrollers and Embedded Systems. By Muhammad Ali Mazidi and Janice Gillispie Mazidi- Pearson Education Asia, 4th Reprint, 2002
2. Microcontrollers. Theory and applications by Ajay V. Deshmukh-Tata McGraw-Hill
3. The 8051 Microcontroller - architecture, programming & applications By Kenneth J. ayala- Penram International Publishing, 1995
4. Programming and Customizing the 8051 Microcontroller. By Myke Predko- TMH, 2003
5. Design with Microcontrollers By - J B Peatman- TMH.
6. The 8051 Microcontroller - Programming, interfacing and applications by Howard Boyet and Ron Katz - (MII) Microprocessors Training Inc.
7. The Concepts & Features of Microcontrollers by Rajkamal - Wheeler Pub.

**Syllabus w.e.f.2016-17 onwards**

**GOVERNMENT CITY COLLEGE, HYDERABAD  
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**B.Sc III Year – Electronics  
Paper VII (ELE1B)**

**Adv.Elective-II  
V-semester (Microprocessor 8086)**

**UNIT-I**

Intel family microprocessors-compare 8-bit and 16-bit micro processors –  
**The 8086 Microprocessor** - General Organization of a Microcomputer, Detailed Architecture of 8086,

**UNIT-II**

Addressing Modes, Instructions, Assembly Language Programming, Programming Examples. The 8086-  
Based **System Design** - Pins and Signals, System Components, Interfacing Memory, I/O Devices, Data  
Converters, Stepper Motor. Interrupts.

**Unit – III**

**Peripheral Interfaces and Interfacing with 8086** : Parallel I/O Methods, Programmable Peripheral  
Interface (8255 A), Key Board /Display interface (8279), Priority Interrupt Controller (8259 A), DMA  
Controller (8237), Programmable Interval Timer (8254), UART PC16550D.

**Reference Books:**

1. Microprocessors, PC Hardware and Interfacing - By N. Mathivanan, PHI, 2003
2. The Intel Microprocessors 8086/8088, 80186/80188, 80286,80386,80486, Pentium,  
Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, Architecture, Programming,  
and Interfacing - By Barry B. Brey, 6th Ed., PHI / PEA, 17th Reprint, 2003
3. The 8086 Microprocessor : Programming & Interfacing the PC - By Kenneth J. Ayala  
a. Penram International Publishing, 1995
4. Advanced Microprocessors and Peripherals - Architecture, Programming and  
Interfacing - By A K Ray and K M Bhurchandi, TMH, 2000
5. Advanced Microprocessors and Interfacing - By Badri Ram, TMH, 2nd Reprint 2002

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B.Sc III Year – Electronics  
Paper VI: ELC6

Core-6  
VI-semester: Microprocessor (8085)

UNIT-I (16HOURS)

**1).Introduction to Microcomputer and Microprocessor:** Intel 8085 Microprocessor central processing unit (CPU), Arithmetic and logic unit (ALU), Timing and control unit. Register organization.

2). Pin configuration of 8085 and its description - Address, data and control buses, Control signals - State Transition Timing diagrams- Instruction cycle, machine cycle, fetch and execute cycles.

UNIT-II (16 HOURS)

1) Addressing modes. Instruction set of 8085, instruction and data formats- classification of instructions.

2) Assembly language programming examples of 8 and 16 bit addition, subtraction, multiplication and division. Finding the largest and smallest in a data array. Programming examples using stacks and subroutines.

UNIT-III (16 HOURS)

**Interfacing peripherals and applications:** Programmable peripheral interface (8255) - D/A and A/D converters and their interfacing to the Microprocessor. Stepper motor control, seven segment LED Interfacing.

**(NOTE: Solving related problems in all the Units)**

**Reference Books:**

1. Microprocessor Architecture and Programming. Ramesh S. Goanker- Penram

2. Introduction to Microprocessor. Aditya. P. Mathur- TMH

1. Microprocessors and Microcontrollers Hardware and Interfacing- Mathivannan- PHI

2. Fundamentals of Microprocessors and Microcontrollers. B. Ram-Dhanpat Rai & Sons.

3. Advanced Microprocessor and Peripherals, Architecture, Programming and Interface-A.K.Ray and K.N. Bhurchandi- TMH

4. Microprocessor Lab Premier- K.A. Krishna Murthy

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**B.Sc III Year – Electronics**  
**Paper VIII (ELE2A)**

**Appl.Elective-I**  
**VI-semester (The 8051 Microcontroller-II)**

**UNIT. I (16 HOURS)**

**1).Interfacing of peripherals to Microcontroller:** Interfacing of - PPI 8255:- 8255 features, Modes of 8255.

2).Digital-to-Analog (DAC) converter, DAC 808, Analog-to- Digital (ADC) converter, ADC0804.

**UNIT . II(16 HOURS)**

**1).Serial communication:** Basics of serial Communication compare serial and parallel communication. Simple, Half and Full-Duplex transfers. Synchronous and asynchronous methods. Data transfer rate,

2). 8051 Serial Communication Programming.SBUF and SCON registers.RS232 standards, RS232pins, 8051 connection to RS232. Temperature measurement.

**UNIT . III (16 HOURS)**

**1).Applications of Embedded Systems:** Displaying information on a LCD,LCD pin description and Interfacing an LCD to the 8051. Control of a Stepper Motor, Interfacing a Stepper Motor to the 8051.

2).Interfacing a keyboard, 8051 interfacing with external ROM and generation different types of waveforms.

**Reference Books:**

1. The 8051 Microcontrollers and Embedded Systems. By Muhammad Ali Mazidi and Janice Gillispie Mazidi- Pearson Education Asia, 4th Reprint, 200
2. Microcontrollers. Theory and applications by Ajay V. Deshmukh-Tata McGraw-Hill
- 3.. The 8051 Microcontroller - architecture, programming & applications By Kenneth J. Ayala- Penram International Publishing, 1995
4. Programming and Customizing the 8051 Microcontroller. By Myke Predko- TMH, 2003
5. Design with Microcontrollers By - J B Peatman- TMH.
6. The 8051 Microcontroller - Programming, interfacing and applications by Howard Boyet and Ron Katz - (MII) Microprocessors Training Inc.
- 7.The concepts & features of Microcontrollers by Rajkamal - Wheeler Pub.
8. The concepts & features of Microcontrollers by Rajkamal - Wheeler Pub.



GOVERNMENT CITY COLLEGE, HYDERABAD  
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B.Sc III Year – Electronics

Appl.Elective-II

Paper VIII (ELE2B)

VI-semester (Digital system design using VHDL)

**Unit I (16 Hours)**

**Basic Language Elements :** Identifiers, Data objects, Data types, Operators.

**Behavioural Modeling :** Entity declaration, Architecture body, Process statement, Variable assignment statement, Signal assignment statement , Wait statement, If statement, Case statement, Null statement, Loop statement, Exit statement, Next statement, Assertion statement, Report statement, other sequential statements, Multiple processes, Postponed processes.

**Unit II (16 Hours)**

**Data Flow Modeling**

Concurrent signal assignment statement, Concurrent versus sequential signal assignment, Delta delay revisited, Multiple drivers, Conditional signal assignment statement, selected signal assignment statement. The unaffected value block statement, concurrent assertion statement, Value of a signal.

**Unit III (16 Hours)**

**Structural Modeling :** An Example, Component declaration, Component instantiation and examples, Resolving signal values.

**Generics,** Configuration specification, Configuration declaration, Default rules, Conversion functions, Direct instantiation, Incremental binding.

**Reference Books:**

1. A VHDL Primer By J.Bhaskar ,Pearson Education Asia , 11<sup>th</sup> Indian reprint,2004
2. The Designer's Guide to VHDL- By Peter J.Ashenden,2<sup>nd</sup> Ed,1<sup>st</sup> Indian reprint , Harcourt India Pvt.ltd 2001.
3. Fundamentals of digital logic with VHDL Design -By Satephen brown and Zvonko Vranesic , TMH2002.

**Syllabus w.e.f.2016-17 on wards**

**GOVERNMENT CITY COLLEGE, HYDERABAD**

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**B.Sc III Year - Electronics**

**PRACTICAL PAPER-V (ELCP3A) (90 hours. 30 sessions)**

**Digital Electronics**

**A) Digital Experiments**

1. Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR gates (By using 7400-series)
2. Construction of gates using NAND, NOR gates.
3. Construction of Half and Full adders and verifying their truth tables.
4. Operation and verifying truth tables of flip- flops- RS, D, and JK using ICs.
5. Construction of Decade counters (7490).
6. Driving Stepper motor using JK flip-flop
7. Simulation experiments using appropriate electronic circuit simulation.
  - a) 4-bit parallel adder using combinational circuits.
  - b) Decade counter using JK flip flops.
  - c) Up/Down counter using JK flip flop.
  - d) Up/Down counter using 7493.

Note: Students has to perform the following experiments

- (1).Any Four experiments among the experiment Numbers 01 to 06
- (2).Experiment Number 07( a,b,c,d ) is compulsory.

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**GOVERNMENT CITY COLLEGE, HYDERABAD**

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B.Sc III Year .Electronics

Practical Paper V (ELEP 3B) (90 Hours- 30 Sessions)

**Microcontroller (8051) Lab**

1. Binary Addition (8-bit and 16-bit)
2. Binary Subtraction
3. Decimal Addition and Subtraction
4. Multiplication of two numbers using MUL command (later using counter method for repeated addition)
5. Division of two numbers using DIV command (later using counter method for repeated subtraction)
6. Addition of 'n' bit data
7. Pick the smallest number among a given set of numbers
8. Pick the largest number among a given set of numbers
9. Arrange .n. numbers in ascending order
10. Arrange .n. numbers in descending order
11. Factorial of given number (<5)

Note: Students has to perform the following experiments

(1).Any **eight** experiments among the experiment Numbers 01 to 11

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**GOVERNMENT CITY COLLEGE, HYDERABAD**

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B.Sc III Year .Electronics

Practical Paper V (ELEP 3C) (90 Hours- 30 Sessions)

**Microprocessor (8086) Lab**

1. Addition of two words ( 16-bit )
2. Multiplication of two words
3. Subtraction of two numbers
4. Division of two numbers.
5. Factorial of a Number
6. Decimal Point Division
7. Centigrade to Fahrenheit Conversion
8. Fahrenheit to Centigrade Conversion
9. Code conversion
10. Smallest & Largest number
11. Ascending and Descending order
12. Sum of Series of Numbers
13. Square of a Number
14. Finding Prime Number

Note: Students has to perform the following experiments

(1).Any **eight** experiments among the experiment Numbers 01 to 14

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**(Autonomous)**

**B.Sc III Year - Electronics**

**PRACTICAL PAPER-VI (ELCP4A) (90 hours. 30 sessions)**

**MICROPROCESSOR (8085) Lab**

**A) MICROPROCESSOR (Software)**

1. Binary addition & subtraction. (8-bit & 16-bit)
2. Multiplication & division.
3. Picking up largest/smallest number.
4. Arranging .ascending/descending order.
5. Decimal addition (DAA) & Subtraction.
6. Time delay generation

**B) MICROPROCESSOR (Hardware)**

1. Interfacing R-2R Ladder network (DAC) (4 bits) to generate waveforms.
2. Interfacing a stepper motor and rotating it clockwise/anti clockwise through a known angle.
3. Interfacing a seven segment display.
4. Interfacing ADC for temperature measurement.

***Note: Student has to perform the following experiments:***

- (i) In Section (A) any Four experiments among experiment numbers 1 to 6
- (ii) In Section (B) Any two experiments .

**Syllabus w.e.f.2016-17 onwards**

**GOVERNMENT CITY COLLEGE, HYDERABAD**

(Autonomous)

B.Sc III Year .Electronics

Practical Paper V (ELEP 4B) (90 Hours- 30 Sessions)

**Embedded Systems and Applications Lab**

Section (A)

1. Interface a ADC and a temperature sensor to measure temperature
2. Interface a DAC & Generate a stair case wave form. With step duration and no. of steps as variables
3. Flash a LED connected at a specified out put port terminal
4. Interface a stepper motor. And rotate it clock wise or anti clock wise through given angle Steps.

Note : students has to perform Interfacing Experiments with simulation

Section (B)

1. Using Keil software write a program to find the multiplication of two numbers
2. Using Keil software write a program to find the Division of two numbers
3. Using Keil software write a program to pick the smallest among a given set of number
4. Using Keil software write a program to pick the largest among a given set of numbers
5. Using Keil software write a program to arrange a given set of numbers in ascending order
6. Using Keil software write a program to arrange a given set of numbers in descending order
7. Using Keil software write a program to generate a rectangular wave form at a specified Port terminal.

***Note: Student has to perform the following experiments:***

- (i) In Section (A) any **Two** experiments among experiment numbers 1 to 6
- (ii) In Section (B) Any **Five** experiments .

**Syllabus w.e.f.2016-17 onwards**

**GOVERNMENT CITY COLLEGE, HYDERABAD**  
(Autonomous)  
B.Sc III Year .Electronics  
Practical Paper V (ELEP 4C) (90 Hours- 30 Sessions)

**VHDL Lab (using XILINX software)**

1. Basic logic gates using behavioral model
2. And gate using NAND & NOR gates in structural
3. Or gate using NAND & NOR gates in structural
4. Not gate using NAND & NOR gates in structural
5. Ex-or gate using NAND & NOR gates in structural
6. Ex-nor gate using NAND & NOR gates in structural
7. 4x1 multiplexer in behavioral model
8. Demultiplexer using in behavioral model
9. Half - adder using dataflow model
10. Half-subtractor using data flow model
11. Full – adder using dataflow model
12. Full – subratctor using dataflow model

***Note: Student has to perform any eight From 1 to 12***

**GOVERNMENT CITY COLLEGE, HYDERABAD**  
**(Autonomous)**  
**Dept of Electronics**

**1<sup>st</sup> & 2<sup>nd</sup> Year ( I , II,III&IV – Semesters)**

**CBCS Examination 2016-17**

**Question Paper Pattern (External)**

**Max. Marks:80**

I. Short answers: (Answer all questions)

5X4=20M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Note: Two Questions are compulsory from each unit**

II Long Answer Questions: (Internal choice)

4X15=60M

9. (A) or (B)
10. (A) or (B)
11. (A) or (B)
12. (A) or (B)

**Question Paper Pattern (Internal)**

**Max. Marks:20**

**Written Examination (Average of two tests)**

15M

**Assignment**

05M





**GOVERNMENT CITY COLLEGE, HYDERABAD**  
**(Autonomous)**  
**PANNEL OF EXAMINERS FOR B.Sc I, II&III YEAR**

<b>S.No</b>	<b>Name of the Professor</b>	<b>Mobile No</b>	<b>College</b>
01	Dr.T.KarunaSagar	9866145020	Osmania University
02	Md.Shareef Uddin	9866589039	Osmania University
03	Dr.C.P.Vardhani		University College for Women, koti
04	Dr.D.Srnivas		University College, Saifabad
05	Dr.M.Srinivas		Osmania University
06	Dr.D.Aparna	9346939524	University College for Women, koti
07	Dr.M.Sreenath Reddy		Nizam College
08	Dr.M.Venkatnarayana		University College for Women, koti
09	Dr.T.Somaiah		University College, Saifabad
10	Dr.B.Ravinder Reddy		University College, Saifabad
11	Dr.C.Srinivas Reddy		University College for Women, koti
12	G.Upender		University College for Women, koti
13	Dr.D.ChinniKrishna	9573523025	Bhavan's New Science College,
14.	N.Gopikrishna		A.V. College
15	J.S.P.L.N Prasad		A.V. College
16	RajaKumari		V.V.College
17	Dr.M.K.MoinUddin		Mumtaz College
18	Narendra Babu		
19	VijayBhaskar Reddy		
20	V.RameshKumar	9490910182	Sujatha Degree and P.G College
21	G.Sridhar	9951435383	HRD Degree and P.G College
22	Sangeetha		University College for Women, koti
23	Sujatha		University College for Women, koti

(From the academic year 2017-18)

# Department of Electronics

The minutes of the Board of Studies meeting held on 30<sup>th</sup> March 2017 for the academic year 2017-18

The following resolutions are taken in Board of Studies meeting

1. I and III year syllabus is reviewed and is ratified
2. I and III year practical syllabus and model question paper are reviewed and approved.
3. The names suggested in panel of examiners are to be incorporated.
4. As and when Osmania University implemented the CBCS system for II year under graduate course (academic year 2017-18) it shall be implemented in toto.

S.NO	NAME AND DISIGNATION	MEMBERS
1.	Dr.S.E.NainaVinodini Asst. Prof of Physics Goverenment City College,Hyderabad	Chairman,BOS Goverenment City College, Hyderabad
2.	Prof K.Sivakumar BOS Chairman (Electronics) Department of Physics Osmania University,Hyderabad	Member
3.	Prof J.Sivakumar Head :Department of Physics Osmania University,Hyderabad	Member
4.	Prof.C.Vishnuvardhan Reddy Department of Physics Osmania University,Hyderabad	Member
5.	Smt.V.Suhasini Lecturer in Physics Goverenment City College,Hyderabad	Member
6.	Sri.P.Poornachander Lecturer in Electronics Goverenment City College,Hyderabad	Member
7.	Ms. S.Swaroopaa Lecturer in Electronics Goverenment City College,Hyderabad	Member
8.	Sri.V.Ramesh Kumar Lecturer in Electronics Sujatha Degree & P.G. College, Abids, Hyderabad	Member(Alumni)

