MANGALORE UNIVERSITY

Office of the Registrar
Mangalagangothri- 574199

No. MU/ACC/CR49/2013-14/A2 Date: 31/5/2014

N O T I F I C A T I O N

Sub: Revised syllabus of Electronics an optional subject for B.Sc. degree programme.

Ref: Academic Council decision No. 1: 18 (2014-15) dated 24-5-2014.

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The revised syllabus of Electronics an optional subject for B.Sc. degree programme which was approved by the Academic Council at its meeting held on 24-5-2014 is hereby notified for implementation with effect from the academic year 2014-15.

Sd/-

REGISTRAR

To:

1) The Principals of the colleges concerned.
2) The Registrar (Evaluation), Mangalore University.
3) The Chairman, UG BOS in Biochemistry, Mangalore University.
4) The Superintendent, Academic Section, O/o. the Registrar, Mangalore University.
5) Guard file

MANGALORE UNIVERSITY

SYLLABUS FOR B.Sc ELECTRONICS (OPTIONAL)

SCHEME OF INSTRUCTIONS AND EXAMINATIONS

Semester & Course Code	Lectures/ Practicals (Hours per week)	Duration of Exam (Hrs)	Max Marks			
			Marks for Final Exam	Marks for I.A	Total Marks	Credits
I Sem EL 101 EL 102(Practical)	 4 3	 3 3	 80 40	 20 10	 100 50	 2 1
II Sem EL 151 EL 152 (Practical)	 4 3	 3 3	 80 40	 20 10	 100 50	 2 1
III Sem EL 201 EL 202 (Practical)	 4 3	 3 3	 80 40	 20 10	 100 50	 2 1
I VSem EL 251 EL 252 (Practical)	 4 3	 3 3	 80 40	 20 10	 100 50	 2 1
V Sem EL 301 EL 302 EL 303 (Practical)	 3 3 4	 3 3 4	 80 80 80	 20 20 20	 100 100 100	 2 2 2
VI – Sem EL 351 EL 352 EL 353 (Practical)	 3 3 4	 3 3 4	 80 80 80	 20 20 20	 100 100 100	 2 2 2

Title of the Theory Papers with Code:	**Code No's of Practical Papers**
EL 101 : Circuit Analysis, Electronic Devices and Digital Fundamentals	EL 102 : Practical – I
EL 151 : Transistor Amplifiers and Digital Electronics	EL 152 : Practical – II
EL 201 : Analog Circuits	EL 202 : Practical – III
EL 251 : Power Electronics and Sequential Circuits	EL 252 : Practical – IV
EL 301 : Electronic Communication EL 302 : Memory Devices, 8085 Microprocessor and 8051 Microcontroller	EL 303 : Practical – V
EL 351 : Radio Receivers, Antennas and Television EL 352 : 8086 Microprocessor and C Language	EL 353 : Practical – VI

SCHEME OF EXAMINATION

SEMESTER – I			**Marks**
Theory – EL 101	Circuit Analysis, Electronic Devices andDigital Fundamentals		80
	Internal Assessment		20
Practical – EL 102	One Experiment in three hours duration		40
	Internal Assessment		10
		Total	**150**

SEMESTER – II			**Marks**
Theory – EL 151	Transistor Amplifiers and Digital Electronics		80
	Internal Assessment		20
Practical - EL 152	One Experiment in three hours duration		40
	Internal Assessment		10
		Total	**150**

SEMESTER – III			**Marks**
Theory – EL 201	Analog Circuits		80
	Internal Assessment		20
Practical – EL 202	One Experiment in three hours duration		40
	Internal Assessment		10
		Total	**150**

SEMESTER – IV			**Marks**
Theory – EL 251	Power Electronics and Sequential Circuits		80
	Internal Assessment		20
Practical – EL 252	One Experiment in three hours duration		40
	Internal Assessment		10
		Total	**150**

SEMESTER – V		**Marks**
Theory – EL 301	Electronic Communication	80
	Internal Assessment	20
Theory – EL 302	Memory Devices, 8085 Microprocessor and 8051 Microcontroller	80
	Internal Assessment	20
Practical – EL 303	One Experiment in four hours duration	80
	Internal Assessment	20
	Total	**300**

SEMESTR – VI		**Marks**
Theory – EL 351	Radio Receivers, Antennas and Television	80
	Internal Assessment	20
Theory – EL 352	8086 Microprocessor and C Language	80
	Internal Assessment	20
Practical – EL 353	8086, 8051, C Programming (one program each) in four hours duration	80
	Internal Assessment	20
	Total	**300**

SEMESTER-I

EL 101: Circuit Analysis, Electronic Devices and Digital Fundamentals.

UNIT I:

1. **Passive Components:** Resistors, Capacitors, Inductors-Types, Identification. Constructional Features-carbon composition, metal film and wire wound resistors. Electrolytic and non-electrolytic capacitors, fixed core and variable core inductors. 0**2 hrs**

2. **DC circuit Analysis:** Current and voltage divider rules, simple problems, ideal current and voltage sources. Kirchhoff's laws, Mesh analysis-2 mesh problems involving maximum of two voltage sources. **03 hrs**

3. **Number System:** Binary number system-addition, subtraction, multiplication, division, representation of negative numbers, subtraction using 1's and 2's complement methods, parity, hexadecimal and octal number systems. Inter conversion of numbers from one base to another. Binary codes-Weighted and non-weighted BCD (Excess-3, gray code) alpha-numeric codes-ASCII and EBCDIC codes. 0**7 hrs**

UNIT II

1. **DC circuits:** Dc response of RC and RL circuits, Pulse response of RC, RL circuits

2. **AC circuits:** Phasors, Ac response of R, L, C, RL, RC and RLC circuits. Series resonance- bandwidth, quality factor. Parallel resonance (qualitative)

3. **RC Filters:** low pass, High pass and band pass filters.
(All ac response should be studied using 'j' operator. **12 Hrs**

UNIT III

1. **Junction Diodes**: PN diode, Zener diode, Varactor diode-construction, characteristic curve, circuit symbol.

2. **Rectifiers:** Half wave and Full wave rectifier (center tap and bridge type)-derivation of expression for output dc voltage, ripple factor and efficiency. Filters: C, L, LC, π type(qualitative)

3. **Measuring instruments:** Multi range voltmeters and ammeters, ohm meters-series and shunt types. Analog multimeter, Principles of measurements, CRT, CRO (block diagram only). Measurement of frequency, phase, current and voltage using CRO. **12 Hrs**

UNIT IV

1. Transistors: Introduction, transistor configurations, action of n-p-n transistor, relationship between current gains, CE characteristic curves, amplifying action of a transistor. Operating point, transistor as a switch.

2. Two port networks: h-parameter of a two- port network-definitions, model, small signal h-parameter model of a transistor in CE configuration, $r_e$model of a transistor in CE configuration. **12 Hrs**

Reference Books:

1. Network Analysis-G. K. Mithal, Khanna publishers, New Delhi
2. Electronic Devices-Thomas L Floyd-Pearson Education Publuication-6th Edition, 2004.
3. Basic Electronics and Linerar circuits-N. N. Bhargava, D.C Kulashreshta and S.C.Gupta-Tata McGraw Hill Publications – 1984.
4. Principles of Electrical Engineering and Electronics-V.K.Mehtha- S Chand and Co Publishers- 2011.
5. Electronics Principles-A.P. Malvino – Tata McGraw Hill Publication – 3rd Edition- 1993.
6. A Text book of Applied Electronics-R.S.Sedha- S Chand and Co Publishers- 1997.
7. Introductory Circuit Analysis- Robert Boylstead – 6th Edition – Merrill Publication- 1990.
8. Fundamentals of Electronics- B Basavaraj- Omkar Publications- 2003.
9. Digital Principles and Applications-A P Malvino and D P Leach- Tata McGraw Hill Publication- 5th edition, 2002.
10. Digital Logic and Computer Design- Morris Mano- Prentice Hall India Publication- 2000.

Pattern of Question Paper :

Section – A

a) Multiple choice questions	8x1 = 8
b) Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	**:** 1 question out of 2	1x15 =15
Unit – II	**:** 1 question out of 2	1x15 =15
Unit – III	**:** 1 question out of 2	1x15 =15
Unit – IV	**:** 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 102 : PRACTICALS – I

List of Experiments: (minimum of EIGHT experiments o be done)

1. RC Integrator and RC Differentiator
2. Charging & Discharging of a Capacitor in an RC Circuit
3. Low pass & High pass filters
4. Series Resonance and Parallel Resonance
5. Semi-conductor Diode characteristics and Zener Diode characteristics
6. Half wave & Full wave Rectifier
7. Transistor Characteristics
8. Determination of Hybrid parameters of a transistors
9. Investigation of L & C in an AC circuits using Vector diagram method
10. Verification of Current Divider, Voltage Divider rule and Kirchhoff's laws

Pattern of Examination

A candidate will do ONE experiment in THREE hours duration

Allotment of marks	**Marks**
Practical records	08
Viva	02
Experiment	30
Total	**40**

Scheme of Valuation :	**Marks**
Formula/ Specimen graph/ Specimen Truth table	02
Circuit Diagram	04
Tabular Column/ Design Calculation	
Selection of Components/ Pin configuration	04
Circuit Layout, Connections	04
Getting the experiment response	04
Method of taking readings, Tabulation, Trials	08
Calculations, Graph, Result	04
Total	**30**

SEMESTER II

EL 151: Transistor Amplifiers and Digital Fundamentals

UNIT I

1. **Network theorems:** Superposition theorem. Thevenin's theorem, source transformation principle, Norton's theorem. Maximum power transfer theorem-statement, proof and application (In all the cases problems involving maximum of two sources to be worked out.) Millmann's theorem-statement and applications. 06 **Hrs**

2. **Transistor Biasing:** Fixed bias, fixed bias with emitter resistor, collector feedback bias, emitter bias, voltage divider bias with emitter resistor (universal bias). Equation for dc load line, stability of Q-point and design of each biasing circuits to be discussed. **06 Hrs**

UNIT II

1. **Small signal amplifiers: AC load line, coupling and bypass capacitor,** CE amplifier, working, graphical explanation, ac analysis-ac equivalent using h-parameter model, expressions for gain, input and output impedance, AC model, frequency response of CE amplifier, design of CE amplifier, CC and CB amplifiers (qualitative). Application of CC amplifier in impedance matching, Relative merits of CE, CB and CC amplifiers. Mention of applications of CE, CC and CB amplifier. 0**9 Hrs**

2. **Multistage Amplifiers:** Need for cascading of amplifiers, two stage CE amplifiers-direct, RC and transformer coupling, darlington pair, cascode amplifier. **03 Hrs**

UNIT III

1. **Boolean Algebra:** Postulates of Boolean Algebra, Boolean theorems, switching theory, truth table, logic gates-NOT,OR,AND,NAND,NOR, EXOR, EXNOR- truth table, symbol. Boolean functions-Simplification of Boolean functions using Boolean postulates.

06 Hrs

2. **Standard forms of Boolean Functions:** SOP, POS, simplification of Boolean functions using K-map and realization of functions using NAND and NOR gates. **06 Hrs**

UNIT IV

Combinational logic circuit: design procedure with examples- 2-bit magnitude comparator, half adder, full adder, Half subtractor, parity bit generator, code co0nverters. Four-bit parallel binary adder, multiplexers - realization of Boolean functions using 4 to 1 MUX. De-multiplexers- 1 to 4 DEMUX, decoders-2 to 4 line decoders. Encoders- priority encoder. **12 Hrs**

Reference Books:

1. Electronic Fundamentals and Applications, Integrated and Discrete Systems- John D Ryder- Prentice Hall India Publication- 5th edition-2009.
2. Electrical, Electronic and Computer Engineering for Scientists and Engineers-K A Krishna Moorthy and M R Raghuveer – New Age International Publishers - 2007
3. Digital Systems, Principles and Applications- Ronald J Tocci and Neal Widmer – Pearson Education Publication – 8th edition – 2002.
4. An Introduction to Digital Computer Design- V Rajaraman and Radhakrishnan- Prentice Hall India Edition- 5th Edition- 2008.
5. Digital Principles and Applications-A P Malvino and D P Leach- Tata McGraw Hill Publication- 5th edition, 2002.
6. Digital Fundamentals – Thomas Floyd – Pearson Education Publication – 8th Edition – 2002.
7. Digital Logic and Computer Design- Morris Mano- Prentice Hall India Publication- 2000.
8. Modern Digital Electronics-R P Jain – Tata McGraw Hill Publications- 1997.
9. Electronic Devices and Circuit Theory-Robert L Boylestad and Louis Nashelskey, Prentice Hall India Publication- 6th edition-1998.

Pattern of Question Paper :

Section – A

a) Multiple choice question	8x1 = 8
b) Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20% - 25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 152: PRACTICALS - II

List of Experiments: (Minimum of EIGHT experiments to be done)

1. Transistor Biasing circuits – fixed bias, universal bias and emitter bias
2. CE Amplifier
3. CB Amplifier
4. CC Amplifier
5. Half Adder, Half Subtractor and Full adder
6. Realization of AND, OR, NOT, NOR, XOR, XNOR using NAND gates
7. NOT gate using transistor and AND, OR gates using diodes
8. 4-1 Multiplexer using IC 74151& realization of Boolean function using 4-1 Multiplexers
9. Decoders and Encoders
10. Verification of Boolean postulates and Theorems
11. Verification of Thevenin's and Norton's Theorem

Pattern of Examination

A candidate will do ONE experiment in THREE hours duration

Allotment of marks	**Marks**
Practical records	08
Viva	02
Experiment	30
Total	**40**

Scheme of Valuation :	**Marks**
Formula/ Specimen graph/ Specimen Truth table	02
Circuit Diagram	04
Tabular Column/Design Calculation/ Selection of Components/Pin configuration	04
Circuit Layout, Connections	04
Getting the experiment response	04
Method of taking readings, Tabulation, Trials	08
Calculations, Graph, Result	04
Total	**30**

SEMESTER-III

EL201: Analog Circuits

UNIT I

1. **Operational amplifiers:** Dual input balanced output BJT differential amplifier-Expression for voltage gain, input and output resistances, CMRR. Four configurations of differential amplifier with block diagram. Block diagram of internal modules of the op-amp, ideal op-amp characteristics. Characteristics of practical op—amp.(IC 741)- input offset voltage, input offset current, bias current, input and output resistances, slew rate, CMRR, PSRR and frequency response. Open loop configuration.

2. **Feedback amplifiers:** Four basic feedback configurations (block diagrams only), negative and positive feedback, expression for gain. Voltage series feedback amplifier (non-inverting amplifier) - derivation of expression for closed , loop voltage gain, input and output resistances, voltage follower. Voltage shunt feedback amplifier (inverting amplifier)-derivation of expression for closed loop voltage gain, expression for input and output resistances. Current to voltage converter, inverter. **12 Hrs**

UNIT II

1. **Analog computation using op-amp:** Differential amplifier-derivation of expression for gain, differential amplifier as a subtractor. Summing amplifier-using inverting and non-inverting configurations. Derivation of expression for output voltage, summing amplifier as adder and average. Integrator and differentiator- derivation of expression for output voltage, practical circuit, mention of applications.

2. **Instrumentation amplifier:** Expression for output voltage, application as temperature indicator, temperature controller.

3. **Active filters:** Types, advantages over passive filters. Mention of commonly used active filters-Butterworth, Chebyshev, Causer filters. First order low-pass and high pass Butterworth filters-derivation of expression for gain, operation and design- **12 Hrs**

UNIT III

1. **Comparators:** Characteristics, op-amp as a comparator, applications-Voltage level detector, zero crossing detector, voltage limiters-two side and one side limiting

2. **Schmitt trigger:** Inverting ad non-inverting- expression for UTP and LTP **06 Hrs**

3. **Regulated power supply:** Voltage regulators, factors determining the stability, definition of line regulation and load regulation. Zener shunt regulator action and analysis. Emitter follower type regulator, Stabilization using op-amp and series pass transistor with current limiting facility, IC regulators-3 pin IC regulators-block diagram, fixed and variable (78XX and 79XX and LM 317).

   Qualitative discussion of switch mode power supply (SMPS) and uninterrupted power supply (UPS) using block diagram - **06 Hrs**

UNIT IV

1. **Wave shaping circuits:** Clippers-Unbiased positive and negative clippers, biased positive and negative clippers, double ended clippers. Clampers: positive and negative clampers, positive and negative biased clampers. Voltage doublers (half-wave) and tipplers. **06 Hrs**

2. **Oscillators:** Classification, basic principle of feedback oscillators-Barkhausen criterion. LC oscillators- Principle, Hartley and Colpitt's oscillators (Qualitative.) RC oscillators-Phase shift, Wien bridge oscillators (Qualitative). Square wave generator, triangular wave generator(all circuits to be discussed using op-amp.- **06 Hrs**

Reference Books:

1. Op-amps and Linear Intgrated Circuits- Ramanath A Gayakwad – Prentice Hall India Publication – 3rd Edition- 2009.
2. Electronic Devices and circuits- Salivahanan, Suresh Kumar and Vallavaraj – Tata McGraw Hill Publication- 2nd edition- 2008.
3. Basic Electronics-A P Malvino – Tata McGraw Hill Publication- 3rd Edition- 1993.
4. Operational Amplifiers- Tobey – McGraw Hill Publishers- 1971.
5. Functional Electronics-K V Ramanan – Tata McGraw Hill Publications- 1982.
6. Electronic Devices-Thomas L Floyd-Pearson Education Publuication-6th Edition, 2004.
7. Electronic Devices and Circuit Theory-Robert L Boylestad and Louis Nashelskey, Prentice Hall India Publication- 6th edition-1998.

Pattern of Question Paper :

Section – A

a) Multiple choice question 8x1 = 8
b) Short answer type question
(6 questions out of 8) 6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 202 : PRACTICALS - III

List of Experiments:

1. Clippers and Clampers
2. OPAMP Characteristics
3. OPAMP amplifiers – inverting, noninverting and difference
4. Arithmetic circuits using OPAMP
5. Solution to simultaneous equations
6. Integrator and differentiator
7. Schmitt trigger and comparators using OPAMP
8. Phase shift oscillator using OPAMP
9. Instrumentation amplifier
10. Hartley and Colpitt's oscillators
11. Transistor series regulator
12. Regulated power supply with 03 pin IC (load regulation and line regulation)
13. Switched power supply
14. Adjustable RPS using LM 317

Pattern of Examination

A candidate will do ONE experiment in THREE hours duration

Allotment of marks	**Marks**
Practical records	08
Viva	02
Experiment	30
Total	**40**

Scheme of Valuation :	**Marks**
Formula/ Specimen graph/ Specimen Truth table	02
Circuit Diagram	04
Tabular Column/Design Calculation/ Selection of Components/Pin configuration	04
Circuit Layout, Connections	04

Getting the experiment response		04
Method of taking readings, Tabulation, Trials		08
Calculations, Graph, Result		04
	Total	**30**

SEMESTER IV

EL 251: Power Electronics and Sequential Circuits

UNIT I

1. **Silicon Controlled rectifier:** Construction, Biasing, Operation, equivalent circuit, V-I characteristics, mention of applications, half wave rectifier using SCR.

   TRIAC: Construction, equivalent circuit, operation, V-I characteristics, mention of applications, TRIAC power control, TRIAC phase control circuit using single and double time constants, differences between SCR and TRIAC.

   DIAC: Construction, equivalent circuit, operation, V-I characteristics, mention of applications. **08 Hrs**

2. Logic Families: DTL, RTL, TTL families-NAND gate example should be discussed in each case. MOS-NAND, CMOS-NAND, ECL-OR/NOR. Characteristics of logic families-fan-out, fan-in, noise immunity, propagation delay, packaging density. Comparison of logic families of RTL, TTL, CMOS, ECL. **04 Hrs**

UNIT II

1. **Field Effect Transistors:** JFET-construction, operation of FET, FET parameters, relationship between FET parameters, FET characteristics-drain and transfer, comparison between JFET and BJT, small signal ac model of FET, FET amplifiers-CS amplifier-expression for gain, input and output impedances frequency response, Cd and CG amplifiers (qualitative)

2. **MOSFETs:** depletion and Enhancement type-basic structure, working, drain and transfer characteristics, advantages of n-channel MOSFETs over p-channel. Handling precautions of MOSFETs. **12 Hrs**

UNIT III

1. **Sequential circuits:** RS flip-flop-basic type (using NAND gates), clocked RS flip-flops with timing diagram. D-flip-flop-truth table, timing diagram. JK flip-flop-truth table, timing diagram T-flip-flops.

2. **Registers and counters:** serial load and parallel load shift registers. Synchronous and Asynchronous counters using JK flip-flops. Design of Synchronous counters using T and JK flip-flops.

3. **Digital instruments:** Binary weighed digital to analog converter and counter type analog to digital converter. Digital clock (block diagram). Digital voltmeter (block Diagram).

12 Hrs

UNIT IV

1. **Power Amplifiers:** Classification on the basis of placement of Q-point. Graphical representation, single ended and double ended power amplifiers-class-A resistive load and inductive load –efficiency. Class- B push pull amplifier-efficiency. Audio power amplifier using IC.

2. **Multivibrators:** IC 555-internal structure, working. Astable and monostable – working, mention of expression for frequency/pulse width. **12 Hrs**

Reference Books:

1. Electronic Devices and circuits- An introduction-Allen Mottershed – Goodyear Publishing Company– 1973.
2. Electronic Devices and Circuits- Salivahanan, Suresh Kumar and Vallavaraj – Tata McGraw Hill Publication- 2nd edition- 2008.
3. Digital Systems, Principles and Applications- Ronald J Tocci and Neal Widmer – Pearson Education Publication – 8th edition – 2002.
4. Digital Computer Technology- B N Chatterji – Khanna Publishers - 1980
5. An introduction to digital computer design- V Rajaraman and Radhakrishnan- Prentice Hall India Edition- 5th Edition- 2008.
6. Digital Principles and Applications-A P Malvino and D P Leach- tat McGraw Hill Publication- 5th edition, 2002.
7. Digital Fundamentals – Thomas Floyd – Pearson Education Publication – 8th Edition – 2002.
8. Digital Logic and Computer Design- Morris Mano- Prentice Hall India Publication- 2000.
9. Modern Digital Electronics-R P Jain – Tata McGraw Hill Publications- 1997.
10. Industrial Electronics- Paul Zbar – Tata McGraw Hill Publication – 3rd Edition – 1980.
11. Electronic Devices-Thomas L Floyd-Pearson Education Publuication-6th Edition, 2004.

Pattern of Question Paper :

Section – A

a) Multiple choice question 8x1 = 8

b) Short answer type question
(6 questions out of 8) 6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 252 : PRACTICALS – IV

List of Experiments:

1. JFET characteristics
2. SCR Characteristics
3. TRIAC characteristics
4. FET characteristics
5. MOSFET characteristics
6. DIAC-TRIAC phase control
7. DFT-shift register
8. JKFF-Counter
9. Design of counters
10. TTL and CMOS IC characteristics
11. BCD to 7 Segment Decoder
12. Multivibrators using 555
13. DAC and ADC using Op-Amp
14. DTL NAND and NOR gates

Pattern of Examination

A candidate will do ONE experiment in THREE hours duration

Allotment of marks	**Marks**
Practical records	08
Viva	02
Experiment	30
Total	**40**

Scheme of Valuation :	**Marks**
Formula/ Specimen graph/ Specimen Truth table	02
Circuit Diagram	04
Tabular Column/Design Calculation/	

Selection of Components/Pin configuration	04
Circuit Layout, Connections	04
Getting the experiment response	04
Method of taking readings, Tabulation, Trials	08
Calculations, Graph, Result	04
Total	**30**

SEMESTER V

EL 301: Electronic Communication

UNIT I

1. **Amplitude Modulation:** Need for modulation, amplitude modulation-expression for AM wave, modulation index, band width, frequency spectrum, power relations. Modulator circuit-Emitter modulator. Schemes of AM. Balanced modulator. AM transmitter (Block diagram)

2. **Frequency Modulation:** expression for FM wave, modulation index, varactor diode modulator and FET (or BJT) reactance modulator. Pre-emphasis and De-emphasis circuits. FM transmitter (block diagram). Comparison of AM and FM. **12 Hrs**

UNIT II

1. **Digital communication System**; Types, sampling theorem-Nyquist rate, Pulse Analog modulation-PAM, PTM-PPM, PWM-generation, detection and application. Pulse digital modulation-PCM-generation, detection, comp anding and application, frequency, time division multiplexing. Principles of wireless communications. Mobile communication system-overview of wireless communication system-block diagram, cell principles-cells, cell clusters, cell sites, frequency reuse, cell splitting, call handoff, frequency spectrum. 0**9 Hrs**

2. **Opto electronic devices:** photo conduction, Photo voltaic cell, solar cell, optocouplers, LASCR, solid state relays, photo transistor **03 Hrs**

UNIT III

1. **Transmission lines and Waveguides**: Wire and cables, single ended and distributed lines, basic transmission lines-types, structure, characteristics and applications, balanced and unbalanced lines, characteristic impedance of transmission line, factors which determines characteristic impedance, basic transmission line equations, incident wave, reflected and standing wave. Reflection coefficient, SWR, open circuited and short circuited lines,

standing waves in transmission lines, resonant and non resonant lines, losses in transmission lines, types of waveguides, modes of propagation, comparison of waveguide and transmission lines. **07 Hrs**

2. **Optical fibers:** Introduction to optical fiber communication system-block diagram. Advantages of fibers. Structure of optical fibers. Fiber types- single mode and multi mode fibers, step index and graded index fibers. Attenuation in fibers. Fiber couplers- connectors and splices. **05 Hrs**

UNIT IV

1. **Optical Modulation:** Optical sources: LED, laser diode-construction, characteristics, optical amplifiers, LED analog modulation circuits, laser diode modulation, LED digital modulation,
2. **Optical receivers:** Optical detectors-photo diodes, PN, PIN and avalanche diode-construction and characteristics. **12 Hrs**

Reference Books:

1. Electronic Communication- George Kennedy and Bernard Davis – Tata McGraw Hill Publications – 4th Edition – 1999.
2. Satellite Communication –Dr D C Agarwal – Khanna Publishers – 6th Edition- 2006.
3. Electronic Communication, Modulation and Transmission- Robert J Schoenbeck – Merrill Publishers – 2nd Edition- 1992.
4. Modern Electronic communication- Gary Miller and Jeffrey Beasely, Prentice Hall India Publication – 7th Edition – 2003.
5. Electronic Communication- Dennis Roddy and John Coolen - Prentice Hall India Publication – 3rd Edition – 1994..
6. Fiber Optic Communication- Joseph Palais – Prentice / Pearson Publishers – 5th Edition- 2005.
7. Optic Fiber Communication-Gerd Keiser – McGraw Hill Publication – 3rd Edition- 2000.
8. Hand book of Electronics-Gupta and Kumar – Pragati Prakashan- 17th Edition- 1993.

Pattern of Question Paper :

Section – A

a) Multiple choice question	8x1 = 8
b) Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15

Unit – IV : 1 question out of 2 1x15 =15

Total **80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL302: Memory Devices, 8085 Microprocessor and 8051 Microcontroller

UNIT I

1. **Memory:** Characteristics of memory. Semiconductor memories-RAM-a bipolar memory cell-read/write operation. Dynamic MOS storage cell and static MOS cell-read/write operation in a dynamic MOS cell and static memory cell. Read only memory types- ROM, EPROM, EEPROM (mention only). 4X4 bit diode ROM-read operation. Bulk storage devices- hard disk and optical disks. **08 Hrs**

2. **Digital Computers:** Block diagram of digital computer, micro computer system-input/store/output operation. Generation of micro computers. **04 Hrs**

UNIT II

1. **Microprocessors:** evolution, architecture and characteristics of a generic processor **03 Hrs**
2. **8085 Micro processor: I**ntroduction, architecture-registers, data/address/ control bus. Control and timing unit, flag register, program counter, instruction register and instruction decoder, pins and signals, instruction set-data transfer , arithmetic, logic and branch instructions. Addressing modes, stacks, subroutines. Microprogramming-fetch and execute cycles. Simple programs. **09 Hrs**

UNIT III

8051 Microcontroller: Introduction-microcontroller internal block diagram, advantages of microcontroller over micro processors, microcontroller family (mention only). Architecture of 8051 microcontroller. Pins and signals of 8051, register set of 8051, memory/I/O addressing by 8051, interrupts of 8051. **12 Hrs**

UNIT IV

Programming using 8051: address sing modes of 8051, instruction set of 8051, simple programs using 8051 instructions. 8051 applications-switch/LEDI/O, time delays, ADC interfacing. **12 Hrs**

Reference Books:

1. Digital computer technology- B N Chatterji – Khanna Publishers - 1980
2. An introduction to digital computer design- V Rajaraman and Radhakrishnan- Prentice Hall India Edition- 5th Edition- 2008.
3. Computer System Architecture-Morris Mano – Pearson Education Publication – 3rd Edition- 2007.
4. The 8051 Microcontroller and Embedded Systems- Muhammed Ali Mazidi , Jancie Gillispie Mazidi and Rolino McKinlay- Prentice Hall India Publication – 2nd Edition – 2006.
5. The 8051 Microcontroller-Kenneth J Ayala- Cengage Learning Publications- 3rd Edition- 2005.
6. Advanced Microprocessors and Peripherals- A K ray and K M Bhurchandi – Tata McGraw Hill Publications- 2006-
7. Digital Microprocessor fundamentals- William Klietz – Prentice Hall Publications – 1990.
8. Microprocessor Architecture, Programmin and Applications with 8085 -Ramesh S Gaonkar – Penram International Publishing Pvt Ltd- 5th Edition- 2008.

Pattern of Question Paper :

Section – A

a) Multiple choice question	8x1 = 8
b) Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 303: PRACTICALS- V

List of Experiments: (Minimum of EIGHT experiments to be done)

1. Amplitude Modulation & De-modulation
2. Frequency Modulation
3. Waveform Generators – Sine, Square, Triangle
4. Phase Locked Loop
5. 8x3 bit ROM using 3 to 8 Decoder
6. Characteristics of Laser Diode, Photo Diode and Photo Transistor
7. Characteristics of Opto-Coupler, LASER, IR-LED
8. Amplitude Modulation & Demodulation using Optical Source
9. Analog and Digital Signal Transmission through OFC
10. Measurement of propagation, bending, attenuation and Splice Losses in OFC
11. Low pass & Band pass filters using OP-AMPS
12. Band Pass & Band Stop filters using OP-AMPS
13. IF Amplifiers
14. Frequency Converter (Mixer)

Pattern of Examination

A candidate will do ONE experiment in FOUR hours duration

Allotment of marks	**Marks**
Practical records	15
Viva	05
Experiment	60
Total	**80**

Scheme of Valuation :	**Marks**
Formula/ Specimen graph/ Specimen Truth table	04
Circuit Diagram	08
Tabular Column/Design Calculation/ Selection of Components/Pin configuration	08
Circuit Layout, Connections	08
Getting the experiment response	08
Method of taking readings, Tabulation, Trials	16
Calculations, Graph, Result	08
Total	**60**

SEMESTR VI

EL 351: Radio Receivers, Antennas and Television

UNIT I

1. **Antennas:** Introduction: dipole antenna-radiation resistance, total power radiated ,calculation of electric field intensity at a distance 'r' from a transmitting antenna aperture of an antenna, bandwidth, beam width, directivity, directive gain, efficiency. **05 Hrs**

2. .**Ionosphere:** different modes of radio wave propagation, Ionosphere-formation. Composition and variation. Mechanism of radio wave propagation, role of ionospheric layers in radio communication mention of expression for refractive index of ionosphere. Critical frequency, MUF, skip distance, skip zone and secant law, Virtual height. **07 Hrs**

UNIT II

1. **Radio receivers: receivers:** AM TRF receiver and super heterodyne receiver with block diagram, actual circuit diagram of each stage, receiver characteristics. **06 Hrs**

2. **Demodulation:** AM diode detector, AGC-types, practical diode detector circuit, FM detectors- balanced slope detector, Foster-Seeley discriminator, ratio detector. **08 Hrs**

UNIT III

1. **Television transmission:** Element of TV broadcasting, principle of scanning-interlaced scanning, VSB transmission. TV channel (CCIR-B) allotment of frequency, CCD camera. Composite Video signal (CVS), B/W TV transmitter (using block diagram) **06 Hrs**

2. **Monochrome TV Receivers:** Picture tube, receiver with block diagram. Explanation of each stage, Principles of Contrast and brightness variation. **06 Hrs**

UNIT IV

1. **Principles of Colour TV:** Compatibility, mixing of colours-additive and subtractive luminance and chrominance signals, colour camera, colour systems-NTSC and PAL. Modulation of colour signals. Picture tube, colour killer. **08 Hrs**

2. **Audio appliances:** Principles, block diagram of tape recorder **04Hrs**

Reference Books:

1. Hand book of Electronics-Gupta and Kumar – Pragati Prakashan- 17th Edition- 1993.
2. Electronic communication, modulation and transmission- Robert J Schoenbeck – Merrill Publishers – 2nd Edition- 1992.
3. Electronic Communication- George Kennedy and Bernard Davis – Tata McGraw Hill Publications – 4th Edition – 1999.
4. Wireless Communication Technology- Roy Blake- Thomson Asia Pte Ltd – 1st Edition- 2001.
5. Television Electronics-Milton Kiver
6. Monochrome and Colour Television-R R Gulati- Wiley Eastern Limited- 1983 (17th reprint).
7. Television Engineering- Aravind M Dhake – Tata McGraw Hill Publication- 1991(19th reprint).
8. Television Engineering- Bernard Grob

Pattern of Question Paper :

Section – A

a)Multiple choice question	8x1 = 8
b)Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 352: 8086 Microprocessor and 'C' Language

UNIT I

1. Computer Programming: Algorithm and flow charts with examples, machine level, assembly level and high level languages. **04 Hrs**

2. Programming in C: Character set, data types, variables, constants, operators-arithmetic, logical, bitwise, special operators in C. Associativity and order of precedence of operators (mention only), expressions. Input/output statement-getch ( ), patch ( ), gets ( ), puts ( ), getchar ( ), putchar ( ), printf ( ), scanf ( ). **08 Hrs**

UNIT II

1. **Control and looping statements:** if-else, if-else if-if, switch case, for-while, do-while, continue, break, exit, goto, arrays, strings.

2. **Functions:** declaring, defining, calling, function prototype, actual and formal arguments, passing arguments by reference and by value, return values, local and global variables, recursion, storage classes **12 Hrs**

UNIT III

1. **8086 architecture:** CPU architecture-Bus interface unit-instruction queue, segment register, IP register, execution unit- index and pointer register, ALU and control unit, general purpose register, PSW. **03 Hrs**

2. **Assembly language Programming:** Addressing modes of 8086**,** Data transfer instructions, arithmetic instructions, branch instructions, loop instructions, NOP and HLT instructions, Flag manipulation instructions, Logical instructions, Shift and Rotate instructions, Directives and Operators. **09 Hrs**

UNIT IV

1. **Modular Programming:** Linking and Relocation, Stacks, procedures, Interrupts and interrupt service routines, Macros, Simple programs. **05 Hrs**

2. **Bytes and string manipulation:** String Instructions, REP prefix. **04 Hrs**

3. **I/O Programming:** Fundamental I/O considerations, Programmed I/O, Interrupt I/O. **03Hrs**

Reference Books:

1. Micro Computer Systems, The 8086/8088 Family-Yu chen Liu and Glen a Gibson- Prentice Hall India Publication- 2nd Edition – 1994.
2. The Intel Microprocessors-Barry B Brey- - Prentice Hall India Publication- 4th Edition – 2000.
3. Microprocessors and Interfacing Programming and Hardware-Douglas V Hall – Tata McGraw Hill Publication- 2nd Edition – 1999.
4. Programming in ANSI C-E. Balagurusamy – Tata McGraw Hill Publication- 4th Edition- 2009.
5. Computer Programming in C- V Rajaraman – Prentice Hall India Edition- 1998.
6. Theory and problems of programming with C- Byron S Gotterfield – McGraw Hill Publications – 1991.
7. Let us 'C'- Yashawanth Kanetkar – BPB publications- 5th Edition – 2004.

Pattern of Question Paper :

Section – A

a)Multiple choice question	8x1 = 8
b)Short answer type question (6 questions out of 8)	6x2 =12

Section – B

Unit – I	: 1 question out of 2	1x15 =15
Unit – II	: 1 question out of 2	1x15 =15
Unit – III	: 1 question out of 2	1x15 =15
Unit – IV	: 1 question out of 2	1x15 =15
	Total	**80**

1. Question paper should contain 20%-25% problems
2. Each question in all the units should cover all the chapters
3. The maximum number of subdivisions in each question should not exceed three.

EL 353 Practical VI

List of Experiments

1. Numeric and String Programs in C – Minimum of 10 programs
2. Programming using Microcontroller - Minimum of 10 programs
3. 8086 programming - Numeric and String Programs - Minimum of 10 programs

Pattern of Examination

A candidate will do THREE programs in FOUR hours duration – ONE from 8086, ONE from 8051 and ONE from C programming.

Allotment of Marks		**Marks**
Practical Records		15
Viva		05
Programs		60
	Total	80

Scheme of Valuation:

		Marks
8086 Program		
	Program writing, Logic	14
	Feeding the program, execution	06
8051 Program		
	Program writing, Logic	14
	Feeding the program, execution	06
C Program		
	Program writing, Logic	14
	Feeding the program, execution	06
	Total	**60**