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UNIVERSITY OF MYSORE

Estd. 1916

VISHWAVIDYANILAYA KARYA SOUDHA
CRAWFORD HALL, POST BOX NO. 406
MYSORE-570 005

No.AC.2(S)/401/13-14

Dated: 24-05-2014

NOTIFICATION

Sub: Revision of existing syllabus.

Ref:1. Proceedings of Faculty of Science & Technology Meeting held on14-02-2014.
2. Proceedings of the Meeting of Academic Council held on 29-03-2014.

The Board of Studies in **Electronics (UG)** at its meeting held on 23-11-2013 has resolved to reframe the existing syllabus of B.Sc. in Electronics Course from the academic year 2014-15

The Faculty of Science and Technology and the Academic Council at their meetings held on 14-02-2014.and 29-03-2014 respectively approved the above proposals and the same is hereby notified.

The copy of the modified syllabus of B.Sc. in Electronics is annexed herewith.

for S. Sampath
REGISTRAR 24/5/2014
University of Mysore
MYSORE.

To

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Chairperson, BOS/DOS in Electronics , PG centre of Hassan.
3. The Dean, Faculty of Science & Technology, DOS in Zoology, MGM.
4. The Principals of the Affiliated Science Colleges.
5. The Deputy/Assistant Registrar (Evaluation), University of Mysore, Mysore.
6. Sri Narasimha Murthy, Statistician, E.B. UOM, Mysore.
7. The Supdt AC.1 & AC.2, A.B., Academic Section / PMEB, UOM., Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar(Evaluation), UOM., Mysore.
9. The Case Worker, AC.7, Academic Section, University of Mysore, Mysore.
10. The Section Guard File(Supdt.AC.2), A.B., A.C., UOM.
11. The Schedule File.

UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC.(UG) ELECTRONICS

2014 - 2015

CONTENTS

Particulars .

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

SUBJECTS & PAPER CODE

Semester	Code	Title of the Subject – Theory	Code	Title of the Subject - Practical
I	EL 1.0	Basic Electronics and Network Theorems	ELP 1.0	Basic Electronics and Network Theorems Lab
II	EL 2.0	Amplifiers and Oscillators	ELP 2.0	Amplifiers and Oscillators Lab
III	EL 3.0	Integrated Circuits and Operational Amplifiers	ELP 3.0	Integrated Circuits and Operational Amplifiers Lab
IV	EL 4.0	Transducers, Instrumentation and Programming in C	ELP 4.0	Transducers, Instrumentation and C Programming Lab
V	EL 5.1	Digital Electronics and Microcontroller	ELP 5.1	Digital Electronics and Microcontroller Lab
	EL 5.2	VHDL	ELP 5.2	VHDL Lab
VI	EL 6.1	Communication	ELP 6.1	Communication Lab
	EL 6.2.1	Signals and Systems	ELP 6.2.1	Signals and Systems Lab
♦	EL 6.2.2	Electronic Circuit Design	ELP 6.2.2	Electronic Circuit Design Lab
♦	EL 6.2.3	Programming in C + +	ELP 6.2.3	C + + Programming Lab

♦ El 6.2.2 and El 6.2.3 are Electives

El 6.2.3 not to be opted by students of Computer Science as one of the optional

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

SCHEME OF EXAMINATION

Sem	Paper	Code	Title of the Paper	Duration in Hours			Marks				
							IA Marks		Exam Marks		Total
				Th	Pr	Exam	Th	Pr	Th	Pr	
I	I	EL 1.0	Basic Electronics and Network Theorems	3	3	3	10	10	60	20	100
II	II	EL 2.0	Amplifiers and Oscillators	3	3	3	10	10	60	20	100
III	III	EL 3.0	Integrated Circuits and Operational Amplifiers	3	3	3	10	10	60	20	100
IV	IV	EL 4.0	Transducers, Instrumentation and Programming in C	3	3	3	10	10	60	20	100
V	V	EL 5.1	Digital Electronics and Microcontroller	3	2	3	20	10	80	40	100 +50
	VI	EL 5.2	VHDL	3	2	3	20	10	80	40	100 +50
VI	VII	EL 6.1	Communication	3	2	3	20	10	80	40	100 +50
	VIII	EL 6.2.1	Signals and Systems	3	2	3	20	10	80	40	100 +50
	♦	EL 6.2.2	Electronic Circuit Design	3	2	3	20	10	80	40	100 +50
	♦	EL 6.2.3	Programming in C + +	3	2	3	20	10	80	40	100 +50

♦ El 6.2.2 and El 6.2.3 are Electives

El 6.2.3 not to be opted by students of Computer Science as one of the optional

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

SCHEME OF IA MARKS DISTRIBUTION

IA Marks - Theory

A. Semesters I, II, III and IV

(i) Test = 10 Marks

(ii) Assignment = 10 Marks

IA = Average of Test and Assignment = 10 Marks

B. Semester V Paper V and Paper VI

(i). Test = 20 Marks

(ii). Assignment = 20 Marks

IA = Average of Test and Assignment = 20 Marks

C. Semester VI Paper VII

(i) Test = 20 Marks

(ii) .Assignment = 20 Marks

IA = Average of Test and Assignment = 20 Marks

Paper VIII

(i) Test = 20 Marks

(ii) . Assignment = 10 Marks

(iii). Project Work = 10 Marks

IA = Average of Test , Assignment and Project work = 20 Marks

Project Work : Related to IC applications to be submitted at the beginning of VI Sem

IA Marks - Practicals

Semester I, II, III, IV , V and VI - **10 Marks** - Evaluation of Practical Records.

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

QUESTION PAPER PATTERN – MARKS DISTRIBUTION

1. SEMESTERS I, II, III & IV

- ► There will be three Parts A, B and C.
- ► Part A is from Unit 1, Part B is from Unit 2 and Part C is from Unit 3.
- ► Each Part - 20 marks

PART A , B and C

Each Part Marks Distribution

1.	2 mark questions – Total 3	To be answered 2	2 × 2 =	4 marks
2.	6 mark questions – Total 3	To be answered 2	6 × 2 =	12 marks
3.	4 mark problems – Total 3	To be answered 1	4 × 1 =	4 marks
		Each Part	Total =	20 marks

Grand Total (A + B + C) 60 marks

2. SEMESTERS V & VI

- ► There will be four Parts A, B , C and D
- ► Part A is from Unit 1, Part B is from Unit 2 ,Part C is from Unit 3 and Part D is from all Unit 1, Unit 2 & Unit 3.
- ► Each Part - 20 marks

PART A , B , C and D

Each Part Marks Distribution

1.	2 mark questions – Total 3	To be answered 2	2 × 2 =	4 marks
2.	6 mark questions – Total 3	To be answered 2	6 × 2 =	12 marks
3.	4 mark problems – Total 3	To be answered 1	4 × 1 =	4 marks
		Each Part	Total =	20 marks

Grand Total (A + B + C + D) 80 marks

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

QUESTION PAPER PATTERN – MARKS DISTRIBUTION

Sem	Paper	Part A Unit 1			Part B Unit 2			Part C Unit 3			Part D Unit (1+2+3)			Total Marks
		Question Numbers			Question Numbers			Question Numbers			Question Numbers			
		1 a,b,c	2 a,b,c	3 a,b,c	4 a,b,c	5 a,b,c	6 a,b,c	7 a,b,c	8 a,b,c	9 a,b,c	10 a,b,c	11 a,b,c	12 a,b,c	
		2 Marks	6 Marks	4 Marks	2 Marks	6 Marks	4 Marks	2 Marks	6 Marks	4 Marks	2 Marks	6 Marks	4 Marks	
I	I	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	-	-	-	60
II	II	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	-	-	-	60
III	III	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	-	-	-	60
IV	IV	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	-	-	-	60
V	V	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	80
	VI	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	80
VI	VII	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	80
	VIII	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	2/3	2/3	1/3	80

Subdivision a - 2 marks - Short answer question
Subdivision b - 6 marks - Descriptive answer question
Subdivision c - 4 marks - Problem

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UNIVERSITY OF MYSORE

PROPOSED REVISED SYLLABUS FOR B.SC. ELECTRONICS

2014 – 2015

SCHEME OF PRACTICAL EXAMINATION MARKS DISTRIBUTION

Sem	Paper	Title of the Paper	Marks Distribution		Total Marks
			Subdivision	Marks	
I	I	Basic Electronics and Network Theorems	1. Formula 2. Circuit diagram, Tabular column, Nature of graph 3. Circuit connections, Setting, Taking readings 4. Calculation, graph, result, accuracy, unit 5. Viva	02 03 05 05 05	20
II	II	Amplifiers and Oscillators			
III	III	Integrated Circuits and Operational Amplifiers.			
IV	IV	Transducers and Instrumentation			
		Microprocessor and C Programming	1. Program Writing 2. Entering and Execution 3. Verification, Result 4. Viva	05 05 05 05	20
V	V	Digital Electronics and Microcontroller	1. Circuit , Pin diag, Truth table / Program Writing, Entering 2. Circuit Connection/Execution 3. Result / Verification, result 4. Viva	15 10 10 05	40
	VI	VHDL	1. Program Writing, Circuit diag. Truth tab, Waveform, Entering 2. Execution 3. Result, graph 4. Viva	15 10 10 05	40
VI	VII	Communication	1. Formula, Circuit, Tabular column, Nature of graph 2. Circuit connections, Setting, Taking readings, graph 3. Calculation, graph,result, unit 4. Viva	15 10 10 05	40
	VIII	Signals And Systems	1. Program Writing, Entering 2. Execution 3. Verification, result, graph 4. Viva	15 10 10 05	40
			1. Formula, Circuit diagram, tabular column,		40

	♦ (Elective)	Electronic Circuit Design	nature of graph, Designing 2. Connections, Simulation 3. Calculation, Result, graph,unit 4. Viva	15 10 10 05	
	♦ (Elective)	C + + Programming	1. Program Writing, Entering 2. Execution 3. Result 4. Viva	15 10 10 05	40

I SEMESTER

PAPER - I

BASIC ELECTRONICS AND NETWORK THEOREMS

CODE: EL 1.0

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 60

UNIT 1: Basic Electronics

Active and passive elements. Power Supplies. Transformer – Types. Voltage and Current relations. Time Constant of RL and RC (DC) circuits . AC Fundamentals (Only definitions) **03 Hrs**

Band theory of solids. Types of semiconductors. Semiconductor Diode – PN junction. Junction theory. VI characteristics of a PN diode. The ideal diode. Static and dynamic resistance of a diode. Transistor - Construction and working. Relation between α and β. **03Hrs**

CRO-Block diagram and applications, DMM-Multi range Ammeter, Voltmeter and Ohmmeter. **03Hrs**

Binary Number System – conversions. Binary Operation. Logic Gates. Boolean algebra. De Morgan's theorems. Duality. Problems **03Hrs**

UNIT 2: Semiconductors Devices

Types of diodes - LED and Varactor. Zener diode -Breakdown mechanisms. Characteristics Voltage regulation with line and load variation. Analysis of Half Wave Rectifier, Full Wave Rectifier and Bridge rectifier - derivation of average value, rms value, efficiency and ripple factor. Comparison between different rectifiers. Shunt capacitor Filter. **06Hrs**

Transistor static characteristics in CB, CE and CC modes**.** Comparison **03Hrs**

FETs – Construction and Characteristics. Parameters. Comparison between BJT and FET. MOSFET – Types. Construction. **03Hrs**

UJT – Construction , operation and characteristics. SCR – Construction, operation and characteristics, Problems **03Hrs**

UNIT 3: Network Theorems

Current and Voltage Sources, conversions. KVL and KCL, Mesh analysis. **03Hrs**

Thevenin's theorem, Norton's theorem, Superposition theorem – DC source. Maximum Power transfer theorem – DC source and application to AC circuits. **09Hrs**

Two port networks – h, y and z parameters Problems **02Hrs**

TEXT BOOKS:

1. Basic Electronics-Solid State – B L Theraja - S Chand And Company Ltd

2. Electronic Devices And Circuit Theory – Robert L Boylestad And Louis Nashelsky (PHI)
3. Introductory circuit analysis - Robert L Boylestad Universal Book Stall, New Delhi
4. Circuits and Networks – A. Sudhakar, S.P. Shyammohan, TMH Publications

REFERENCE BOOKS
1. Basic Electronics – Bernord Grob - Tata Mcgraw-Hill Publishing Company Limited, New Delhi..
2. Electronic Circuits – Schaum's Outlines – Mahmood Nahvi And Joseph Edminister
Tata Mcgraw-Hill Publishing Company Limited, New Delhi.

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PRACTICAL - I

BASIC ELECTRONICS AND NETWORK THEOREMS LAB

CODE: ELP 1.0

Examination Marks : 20 **Hrs / week : 3 hrs.**

(Any 8 experiments of the following are to be performed)

1. **CRO – (i) Study of Capacitor charging and discharging with ac/dc source-Time constant Measurement**
   (ii) Lissajous figures – Study of waveform
2. **Impedance measurement in RL and RC circuits**
3. **Thevenin's theorem**
4. **Norton's theorem**
5. **Maximum Power Transfer theorem**
6. **Half – wave and Bridge rectifiers with and without capacitor filters.**
7. **Zener diode - characteristics - Study of voltage regulation (line and load regulation) .**
8. **Transistor output Characteristics in CE configuration – Determination of β .**
9. **FET – Characteristics - Determination of parameters.**
10. **UJT Characteristics – Determination of intrinsic stand-off ratio and negative resistance.**
11. **Verification of De Morgan's theorems.**
12. **Basic Logic gates using diodes and transistors.**

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II SEMESTER

PAPER - II

AMPLIFIERS AND OSCILLATORS

CODE: EL 2.0

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 60

UNIT – 1: Transistor Biasing and Feedback circuits.

Transistor Biasing Circuits – Operating point, Load line, Stability factor. AC biasing.
Analysis of Base, collector and Voltage divider biasing circuits. **09Hrs**
Feedback circuits – Types, Effect on gain, input - output resistances and bandwidth.
Transistor h parameter equivalent circuits in CE, CB and CC configurations. Problems **05Hrs**

UNIT 2: Amplifiers

Transistor Amplifiers – Classification. CE, CB and CC amplifiers. Comparison.
Decibels and frequency response. CE amplifier analysis using h-parameters.
RC coupled two stage amplifier(Description). Multistage Amplifiers – gain calculation. **07Hrs**
Power amplifiers – Transformer coupled Class A amplifier, Class B Push-Pull amplifier,
Power efficiency derivation. Single and double Tuned amplifiers .FET amplifier Problems. **07Hrs**

UNIT – 3: Oscillators

Classification of Oscillators. Basic principle of oscillations. Positive feedback.
Barkhausen criterion (Derivation). **02Hrs**
Study of oscillators - Tuned Collector, Colpitt's, Hartley, Phase shift, Wien bridge oscillators.
Frequency and condition for sustained oscillations (No derivations) Crystal oscillators
UJT relaxation oscillator . **10Hrs**
Multivibrators – Monostable, Bistable and Astable multivibrators Problems **02Hrs**

TEXT BOOKS:

1. Electronic Devices And Circuit Theory – Robert L Boylestad And Louis Nashelsky (PHI)

2. Basic Electronics-Solid State – B L Theraja - S Chand And Company Ltd
3. Electronics Fundamentals and Applications – D. Chattopadhyay and P.C. Rakshit
New Age International Publishers

REFERENCE BOOKS
1. Basic Electronics – Bernord Grob - Tata Mcgraw-Hill Publishing Company Limited, New Delhi.
2. Basic Electronics And Linear Circuits – N N Bhargava, D C Kulshreshtha And S C Gupta,
Tata McGraw-Hill Publishing Company Limited, New Delhi.

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PRACTICAL – II

AMPLIFIERS AND OSCILLATORS LAB

CODE: ELP 2.0
Examination Marks : 20 **Hrs / week : 3 hrs.**

(Any 8 experiments of the following are to be performed)

1. **Voltage Divider Biasing Circuit – To draw the DC load line and determine the Q-point**
2. **CE Amplifier – Frequency response and bandwidth**
3. **FET Amplifier – Frequency response and bandwidth**
4. **Emitter Follower - gain, input and output impedances**
5. **Voltage feedback amplifier – effect on gain and bandwidth**
6. **Hartley oscillator**
7. **Coplpitt's oscillator**
8. **UJT relaxation Oscillator**
9. **Phase shift oscillator**
10. **Wien bridge oscillator**
11. **Astable Multivibrator**
12. **Monostable Multivibrator**

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III SEMESTER

PAPER - III

INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIERS

CODE: 3.0

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 60

UNIT 1: Integrated Circuits & Op. Amps.

IC classification. Fabrication – Steps, Fabrication of resistor, capacitor, diode and transistor. Advantages. Limitations. **06Hrs**

OP. AMPs. – Differential Amplifier – types, Op. Amp – block diagram, Ideal Characteristics, **02Hrs**

Equivalent circuit. Open-loop and close- loop Op. Amp. configurations. Virtual ground. Ideal voltage transfer curve. CMRR, Slew rate. Problems **06Hrs**

UNIT 2: Op. Amp. Applications.

Inverting and Non-Inverting Op. Amps.– Derivation of exact and ideal relations for gain, input resistance, output resistance and bandwidth. Difference Op. Amp. **04Hrs**

Summing, subtracting, scaling and averaging amplifiers. Differentiator. Integrator. Voltage to current and current to voltage converters **06Hrs**

Oscillators – Phase shift oscillator. Wien bridge oscillator. Square wave and triangular wave generators. Schmitt Trigger, Comparator. Problems. **04Hrs**

UNIT 3: Timers, regulators and special ICs

555 timer – pin and functional diagram. Analysis of Astable Multivibrator. Square wave generator. Analysis of Monostable Multivibrator. Frequency divider. Ramp, generator. **08Hrs**

Transistor voltage regulator, Op. Amp. voltage regulator,

IC voltage regulators – Fixed voltage and adjustable voltage regulators.

PLL, VCOs, Problems **06Hrs**

TEXT BOOKS:

1. Op-Amps and Linear Integrated Circuits. Ramakanth A Gayekwad: Pearson Education Asia
2. Basic Electronics-Solid State – B L Theraja - S Chand And Company Ltd
3. Integrated Circuits – K. R. Botkar Khanna Publishers.
4. Linear Integrated Circuits and Applications – U.A. Bakshi, A.P.Godse

Technical Publications, Pune

REFERENCE BOOKS

1. Jacob Millman and Christos C Halkias: Integrated Electronics, TMH, 2005
2. Robert F Coughlin and Frederick F Driscoll – Operational Amplifiers and Linear Integrated

Circuits, Prentice – Hall of India, 2003

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PRACTICAL – III

INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIERS LAB

CODE: ELP 3.0

Examination Marks : 20 **Hrs / week : 3 Hrs.**

(Any 8 of the following are to be performed)

1. **Measurement of Op. Amp. parameters**
2. **Inverting and Non-Inverting DC amplifiers**
3. **Inverting and Non-Inverting AC amplifiers**
4. **Op. Amp. Adder and Subtractor**
5. **Op. Amp. Differentiator and Integrator**
6. **Voltage to current converter**
7. **Op. Amp. Wien Bridge Oscillator**
8. **Op. Amp. Phase shift Oscillator**
9. **Schmitt Trigger**
10. **IC 555 – Astable Multivibrator**
11. **IC 555 – Monostable Multivibrator**
12. **IC Voltage regulators**

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IV SEMESTER

PAPER - IV

TRANSDUCERS, INSTRUMENTATION AND PROGRAMMING IN C

CODE: EL 4.0

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 60

UNIT 1: Performance Characteristics of Instruments

Elements of a measurement system, Review of instrument types, **03Hrs**

Static and Dynamic characteristics of Instruments. Types of Errors. Study of Systematic errors and their reduction, **06Hrs**

Signal transmission – Electrical, Pneumatic and fiber optic transmissions, Radio telemetry. Intelligent devices. Capacitive, Magnetic and resistive sensors. Problems **05Hrs**

UNIT 2: Op. Amp. Applications.

Op. Amp. Instrumentation amplifier. Active Filters – First order(Detailed analysis) and second order low-pass and high-pass Butterworth filters. **04Hrs**

Log and antilog Op. Amp circuits. Electronic Analog Computation. (using Op.Amps) Symbols for analog computation .Solution of differential equations **04Hrs**

DAC and ADC converters. . Op. Amp. rectifiers, clippers and clampers. Problems. **06Hrs**

UNIT 3: Microprocessor and Programming in C.

Microprocessors – As Programmable devices, memory, input/output, as MPU Organization of a Microprocessor-Based System. Microprocessor Instruction set and computer languages. Flowcharts and algorithms. Octal and Hexadecimal Number Systems. Conversions and operations. Introduction to 8085 ALP–The 8085 Programming Model, Instruction Classification, Data Format and Storage, Simple Programs. **08Hrs**

Programming in C – Introduction, Character set, C tokens, Keywords and identifiers, Constants - Types, Variables – declaration, assigning values, Operators and Expressions. Decision making – Branching and Looping. Simple Programs **06Hrs**

TEXT BOOKS:

1. Measurement and Instrumentation Principle - Allan S. Morris Elsvier Publication.
2. Op-Amps and Linear Integrated Circuits. - Ramakanth A Gayekwad:, Pearson Education Asia

3. Microprocessor, Architecture, Programming and Applications with the 8085 – Ramesh Gaonkar, Penram International Publishing (India) Private Limited
4. Programming in ANCI C – E. Balaguruswamy, TMH Education Private Limited.

REFERENCE BOOKS

1. Electronic Devices Applications and Integrated circuits - Mathur, Kulshreshta & Chada Umesh Publications
2. Linear Integrated Circuits and Applications – U.A. Bakshi, A.P.Godse Technical Publications, Pune

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PRACTICAL – IV

TRANSDUCERS, INSTRUMENTATION AND C PROGRAMMING LAB

CODE: ELP 4.0

Examination Marks : 20 **Hours / week : 3 Hrs.**

(Any 8 of the following are to be performed)

1. **OP. Amp. Voltmeter**
2. **Op. Amp. Instrumentation amplifier.**
3. **First order low-pass Butterworth filter**
4. **First order high-pass Butterworth filter**
5. **Op. Amp. R-2R ladder network .for D/A conversion**
6. **A/D converter using comparator**
7. **Op. Amp. rectifiers**
8. **Clippers with input and reference voltage variation**
9. **Clampers with input and reference voltage variation**
10. **Microprocessor – Addition**
11. **Microprocessor – Subtraction**
12. **C Program**

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V SEMESTER

PAPER - V

DIGITAL ELECTRONICS AND MICROCONTROLLER

CODE: EL 5.1

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 80

UNIT 1: Digital Electronics

Binary Codes – Weighted and Non-weighted codes. ASCII, EBCDIC, BCD, GRAY, EXCESS – 3 codes..Conversion between Binary and Gray codes. Parity codes. Parity generators and checkers. **04Hrs**

Binary Adders and Subtractors. Multiplexers, Decoder and Encoder.

Simplification of Boolean expressions – using Boolean laws and k – map methods. **05Hrs**

Logic families – TTL and CMOS - NAND and NOR gates.

Flip-flops, Shift registers, Counters. Memory – types, RAM and ROM. Problems **05Hrs**

UNIT 2: Microcontroller – 8051 - Architecture.

Number System – Binary, Octal and Hexadecimal – mathematical operations and Conversions Binary Subtraction by 1's and 2's complement methods. Problems **06Hrs**

Microcontroller 8051 – Pin configuration, Ports, Registers, Timers and counters, Interrupts, Memory, **08Hrs**

UNIT 3: Programming – Microcontroller – 8051

8051 Addressing modes and moving data

Arithmetic , Logical, and Jump operations, Programs **08Hrs**

Counter , Timer Programming, Interrupt Programming.

Interfacing with external devices. – DAC and Stepper Motor. **06Hrs**

TEXT BOOKS:

1. Digital Principles and Applications – Albert Paul Malvino and Donald P Leach McGrawHill
2. Modern Digital Electronics – R. P. Jain – TMH Publishing Company Limited
3. The 8051 Microcontroller and Embedded Systems – Mohammed Ali Mazidi and

Janico Gillispie Mazidi – Pearson Education
4. The 8051 Microcontroller Architecture, Programming and Applications - Kenneth J Ayala,

2e Penram International

REFERENCE BOOKS

1. Digital Circuits - Part I and Part II - D. Raychaudhuri – Eureka Publisher, Kolkata
2. Digital Fundamentals – Floyd L Thomas, Universal Book Stall, New Delhi

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PRACTICAL – V

DIGITAL ELECTRONICS AND MICROCONTROLLER LAB

CODE: ELP 5.1

Examination Marks : 40 **Hours / week : 3 Hrs.**

(Any 4 Digital experiments and any 4 µC experiments of the following are to be performed)

Digital Experiments

1. **Realization of OR, AND, NOT, NAND, NOR, XOR and XNOR gates using Universal Gates.**
2. **Half Adder, Full Adder, Half Subtractor and Full Subtractor**
3. **Parallel Adder and Subtractor**
4. **Counters – Modulo – n and Synchronous counters**
5. **Study of RAM / Shift Register**
6. **Decoder and Encoder**

Microcontroller – 8051

7. **Addition and Subtraction / Multiplication and Division**
8. **Largest and Smallest of N numbers**
9. **Arranging the numbers in Ascending order and Descending order**

10. **Decimal Up/Down Counters**

11. **DAC interface**

12. **Stepper Motor interface**

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PAPER - VI

VHDL

CODE:5.2

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**

Examination Marks : 80

UNIT 1: Basic Language Elements and Behavioral Modeling

Basic Language Elements - Identifiers, Data Objects, Data Types, Operators. Behavioral 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. More on Signal Assignment Statement. Other Sequential Statements. **14 Hrs**

UNIT 2: Dataflow Modeling and Structural Modeling

Dataflow Modeling – Concurrent Signal Assignment Statement, Concurrent versus Sequential Assignment, Delta Delay Revisited. Multiple Drivers, Conditional Signal Assignment Statement., Selected Signal Assignment Statement. The UNAFFECTED Value. Block Statement, Concurrent Assertion Statement, Value of Signal. **08 Hrs**

Structural Modeling – Component Declaration, Component Instantiation, Examples. Resolving Signal Values. **06 Hrs**

UNIT 3: Generics, Subprograms, Packages and Libraries

Generics. Need for Configurations, Configuration Specification, Configuration Declaration, Default Rules, Conversion Functions, Direct Instantiation, Incremental Binding **05 Hrs**

Subprograms and Overloading – Subprograms, Subprograms Overloading, Operator Overloading, Signatures, Default Values for Parameters. **05 Hrs**

Packages and Libraries – Package Declaration, Package Body, Design File, Design Libraries, Order of Analysis, Implicit Visibility, Explicit Visibility. **04Hrs**

TEXT BOOKS:

1. VHDL Primer – J. Bhaskar – Pearson Education

REFERENCE BOOKS

1. VHDL Programming by Example – Douglas L. Perry - TMH

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PRACTICAL – VI

VHDL LAB

CODE: ELP 5.2
Examination Marks : 40 **Hours / week : 3 hrs.**

(Any 8 of the following are to be performed)

1. **Basic logic gates**
2. **Adders**
3. **Subtractors**
4. **Structural model of a Boolean expression**
5. **Counters**
6. **Multiplexer**
7. **Decoder and Encoder**
8. **Flip-flops**
9. **Shift register**
10. **Program using Functions**
11. **Program using Procedures**
12. **VHDL program simulation using FPGA kit**

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VI SEMESTER

PAPER - VII
COMMUNICATION

CODE:EL 6.1

Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**
Examination Marks : 80

UNIT 1: Transmitters

AM and FM transmitters – Explanation with block diagram. Theory of AM,
Frequency Spectrum of AM wave, representation of AM, Power relation,
Current calculation. Modulation by several sine waves. Generation of AM – basic Requirement.
Emitter Modulation. SSB – Introduction. Suppression of carrier, Balanced Modulator,
Suppression of unwanted side band – Phase shift method, Vestigial sideband transmission
Frequency and Phase Modulation – Theory of Frequency and Phase modulation.
Comparison – FM and AM, FM and PM.
Generation of FM – Basic reactance Modulator, Indirect method(Armstrong)
Pulse Communication – PAM, PWM,PPM,PCM – Principles of PCM, advantages
and applications of PCM. Problems **14 Hrs**

UNIT 2: Receivers

Receiver Characteristics – Sensitivity, Selectivity, Image frequency and its rejection,double spotting.TRF receivers, Superheterodyne receiver. Detection and AGC(Practical diode detector).
FM demodulator – Slope detector, Balanced Slope detector, Phase Descriminator.
Transmission lines – Basic principles, Characteristic Impedance, Losses.
Radiation and propagation of waves – Ground waves, Sky waves, Introduction to Ionosphere.
Antennas – Current and Voltage distribution, resonant and non-resonant antennas,
Antenna with parabolic reflector(Geometry of parabola, properties of paraboloidal reflector.
TV transmission and reception – Block diagram of transmitter(B/W), Scannining – types.
Vidicon camera tube. Block diagram of receiver(B/W).
Elements of colour TV. Primary colors – Addition and Subtraction. Problems **14 Hrs**

UNIT 3: Satellite Communication and Fiber optics

Satellite communication – Kepler's laws of planetary motion, orbits, station keeping, path loss,
Antenna look angles, Limits of visibility, Transponders, Multiple access methods,
Fiber Optics – Construction, applications, advantages, losses. Expression for Numerical aperture,
Types of optical fibers – Step index, Graded index. Different Modes.
Sources and detectors – Photo-multiplexer, phototransistor, LED's and LCDs. Laser diodes.
Microwave Communication – Radar, Modems, Mobile Communication. Problems **14 Hrs**

TEXT BOOKS:

1. Electronic Communication Systems – George Kennedy - TMH
2. Satellite Communication – Dennis Roddy and Coolan, McGraw Hill.
3. Optical Fiber Communication – Gerd Keiser – McGraw Hill

REFERENCE BOOKS

1. Electronic Communication Systems – Willium Schweber – PHI
2. Communication Electronics – N.D. Deshpande, D.A. Deshpande and P.k. Rangole - TMH

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PRACTICAL – VII

COMMUNICATION LAB

CODE:ELP 6.1

Examination Marks : 40 **Hours / week : 3 Hrs.**

(Any 8 of the following are to be performed)

1. **AM Modulation**
2. **AM Detection**
3. **FM Modulation**
4. **IF Amplifier**
5. **RF Amplifier**
6. **Frequency Mixer**
7. **Radiation pattern of dipole antenna**
8. **Radiation pattern of LED**
9. **PWM using IC 555**
10. **PPM using IC 555**
11. **Analog fiber Optic link – Frequency response**
12. **Numerical aperture and attenuation loss in fibers**

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PAPER - VIII
SIGNALS AND SYSTEMS

CODE: EL 6.2.1
Hours / week : 3 Hrs. **Total teaching period : 42 Hrs.**
Examination Marks : 80

UNIT 1: Introduction to DSP
Classification of Signals. Basic Operations on Signals. Basic Discrete – Time Signals. Properties of Systems. Linear Time-Invariant Systems. Properties of Systems.
Z – Transform – Introduction, Definition, ROC and its properties. ROC and Stability
Z – Transform and ROC of (i) Finite Duration Sequences and (ii) Infinite Duration Sequences
Z – Transform of some useful Sequences
Inverse Z – Transforms using Partial Fraction Expansion Method. Problems **14Hrs**

UNIT 2: Discrete Fourier Transform
DFT - Introduction. Definition of DFT and IDFT. Periodicity of X(k) and x(n). Matrix relation for computing DFT and IDFT. Concept of Circular Shift and Circular Symmetry.
Properties of DFT – Linearity, Circular Time Shift and Circular Frequency Shift
FFT – Introduction, Decimation-in-time FFT(Computation of both DFT and IDFT), Cooley-Tukey algorithm, In-place computations. Decimation in Frequency FFT, (Computation of both DFT and IDFT) Problems **14Hrs**

UNIT 3: Filter design
IIR Filters – Analog Filter specifications, Classification of Analog Filters, Butterworth Filters, Frequency Transformation, Design of Low – Pass Butterworth Filters
Digital Filters.. Analog design using Digital Filters.
FIR filters – Introduction. Impulse response of Windows for FIR filters .
Realization of Digital Filters – Direct Form (I and II) and Parallel Realization of IIR Filters.
Problems **14Hrs**

TEXT BOOKS:

1. Digital Signal Processing – DR. D Ganesh Rao and Vineeta P Gejji – Sanguine Technical Publishers, Bangalore
2. Digital Signal Processing – Ramesh babu P – Scitech Publicaions(India) Limited

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REFERENCE BOOKS

1. Proakis and Manolakis – Digital Signal Processing – Principles, algorithm and application, 3e,Pearson/PHI

2. Oppenheim and Schaffer – Discrete Time Signal Processing, Pearson/PHI

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PRACTICAL – VIII

SIGNALS AND SYSTEMS LAB

CODE:ELP 6.2.1

Examination Marks : 40 **Hours / week : 3 Hrs.**

(Any 8 of the following are to be performed using MATLAB)

1. **Linear Convolution and Circular Convolution**
2. **DFT of a sequence – direct method**
3. **IDFT of a sequence – direct method**
4. **Linear Convolution using DFT and IDFT**
5. **Circular Convolution using DFT and IDFT**
6. **Sampling theorem**
7. **Solution of simple difference equation**
8. **Impulse response of a system**
9. **Frequency response of a system**
10. **DFT using FFT**
11. **IDFT using FFT**
12. **FIR / IIR filter Design**

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ELECTIVES

PAPER – VIII
(Elective)

Electronic Circuit Design

CODE:EL 6.2.2
Hours / week : 3 hrs. **Total teaching hours : 42 hrs**
Examination Marks : 80

UNIT 1: Circuit design using passive components and diode
Clipping Circuits – Positive clipper, Negative Clipper – with and without reference voltage
Clamping Circuits – Positive clamper, Negative clamper – with and without reference voltage.
RC high- pass and low- pass filters,
Rectifiers – Diode Half- wave Rectifier, Full -Wave Rectifier and Bridge Rectifier
Filters – Study of filters. Application in rectifiers.
Zener diode voltage regulator – line and load regulation **14 Hrs**

UNIT 2: Circuit Design using BJT and FET
BJT Circuits – Switching action, logic gates, Voltage regulator
Biasing circuits – Base bias, Collector bias and Voltage Divider bias circuits
CE amplifier, Emitter follower, Colpitt's oscillator, Hartley oscillator, Phase shift oscillator,
Wien bridge oscillator. Multivibrators – Astable, Monostable and Bistable.
FET Circuits – Amplifier, **14 Hrs**

UNIT 3: Circuit Design using Op. Amp. and 555 Timer
Op. Amp. Circuits – Inverting and Non-Inverting modes for ac/dc input, Adder,
Scale changer, Zero-crossing detector, Multivibrators, Wien bridge oscillator, Phase shift oscillator,
Schmitt trigger, Analog computer circuits for simple equations.
555 Timer Circuits – Astable Multivibrator, Monostable Multivibrator, Square wave generator,
Frequency divider circuits, Application to LED circuits. **14 Hrs**

TEXT BOOKS:

1. Electronic Devices And Circuit Theory – Robert L Boylestad And Louis Nashelsky (PHI)
2. Circuits and Networks – A. Sudhakar, S.P. Shyammohan, TMH Publications
3. Electronic Devices Applications and Integrated circuits - Mathur, Kulshreshta & Chada
   Umesh Publications
4. Linear Integrated Circuits and Applications – U.A. Bakshi, A.P.Godse
   Technical Publications, Pune

REFERENCE BOOKS

1. Op-Amps and Linear Integrated Circuits. - Ramakanth A Gayekwad:, Pearson Education Asia
2. Basic Electronics-Solid State – B L Theraja - S Chand And Company Ltd
3. Basic Electronics – Bernord Grob - Tata Mcgraw-Hill Publishing Company Limited, New Delhi

(Note: Variations of the above books may be adopted appropriately)

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PRACTICAL – VIII
(Elective)

Electronic Circuit Design Lab
(Using PSPICE)

CODE:ELP 6.2.2

Examination Marks : 40 **Hours / week : 3 hrs.**

(Any 8 of the following are to be performed using Pspice)

1. **Design and Simulation of diode Hallf-Wave Rectifier / Full-Wave Rectifier**
2. **Design and Simulation of diode Bridge Rectifier**
3. **Design and simulation of CE amplifier**
4. **Design and Simulation of Op. Amp. - Inverting amplifier (ac/dc)**
5. **Design and Simulation of Op. Amp. - Non-Inverting amplifier (ac/dc)**
6. **Design and Simulation of Op. Amp. adder for a given output**
7. **Design and Simulation of Op. Amp. Butterworth First order low-pass filter**
8. **Design and Simulation of Op. Amp. Butterworth First order high-pass filter**
9. **Design and Simulation of 555 Timer – Astable multivibrator**
10. **Design and Simulation of 555 Timer – Monostable multivibrator**
11. **Design and Simulation of 555 Timer – Frequency divider circuit.**
12. **Design and Simulation of Op. Amp. Analog Computational Circuit**

(Note: Variations of the above may be adopted appropriately)

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PAPER – VIII
(Elective)

Programming in C++

CODE:EL 6.2.3

Hours / week : 3 hrs. **Total teaching hours : 42 hrs**

Examination Marks : 80

UNIT 1: Introduction to C++

Basics of C++ - Data types , variable declaration, operators and the related topics.

Control Statements and loops: Relational & logical operators, IF & switch statements, loops in general, For loop, WHILE and DO WHILE loops.

Pointers, Addresses & indirection operators, data variables and memory, address operators, pointers **14 Hrs**

UNIT 2: Functions and Arrays

Functions Basics – Functions in C++, basic format, requirement for writing function, static and global variables, pointers & functions

Arrays – Using single data variables, array fundamentals, one-dimensional arrays and functions, character strings.

User defined data types – Customized data types, data structures, accessing structure elements, structure arrays, structure within structures, structures and functions, structure arrays & functions, enumerated data types. **14 Hrs**

UNIT 3: Classes and Objects

Classes and Objects – Object oriented principles and definitions, Classes and Objects, writing member functions, Class constructors and destructors, examples, array of objects, pointer and classes.

Class Relationships – Using C++ language classes, user defined classes. **14 Hrs**

TEXT BOOKS:

1. C++ Programming today – Barbara Johnston, PHI/Pearson Education

REFERENCE BOOKS

1. Programming in C++ - Timothy B D'Orazio, McGraw Hill

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PRACTICAL – VIII
(Elective)

C++ Programming Lab

CODE:ELP 6.2.3
Examination Marks : 40 **Hours / week : 3 hrs.**

(Any 8 of the following are to be performed)

1. **Arranging a set of numbers in ascending and descending order**
2. **Sorting a set numbers into Odd and Even.**
3. **Locate a given character in the string of a character array**
4. **Generating Fibonacci series**
5. **Sorting a set of words in alphabetical order**
6. **Program with User Defined data types**
7. **Program using Classes and objects**
8. **Program for a simple data-base application**

(Note: Variations of the above may be adopted appropriately)

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MODEL QUESTION PAPER

EL1.0 **MODEL QUESTION PAPER**

I Semester B.Sc. Examination, Nov / Dec 2013

(Semester Scheme, 2014 - 2015 onwards)

Electronics

Basic Electronics and Network Theorems

Time: 3 Hours **Max. Marks.: 60**

Instructions: Answer **all** parts.

Each part carries **equal** marks

PART A

1. Answer any **TWO** of the following **2 × 2 = 4 Marks**

   (a) Mention the Active and Passive elements.

   (b) What are the properties of an ideal diode ?

   (c) Write the symbol of basic logic gates

.2 Answer any **TWO** of the following. **2 × 6 = 12 Marks**

   (a) Derive the relation for the time constant of RC and RL circuits with a DC source.

   (b) Explain the Block diagram and any one application of a CRO

   (c) State and explain De Morgan's theorems.

3 Answer any **ONE** of the following. **1 × 4 = 4 Marks**

   (a) Determine the V_{DC} and V_{RMS} of an ac signal given by

   $v = 15 \sin 2000t$

   (b) (i) $(11001)_2$ = (?) (ii) (54.75) = (?)$_2$

   (c) If I_C = 5 mA and I_B = 100 µA , determine the values of α and β.

PART B

4 Answer any **TWO** of the following **2 × 2 = 4 Marks**

(a) Name different types of diodes

(b) Write the symbols of FET and MOSFET.

(c) Draw the Bridge rectifier circuit

.5 Answer any **TWO** of the following. **2 × 6 = 12 Marks**

(a) What is a Half Wave rectifier. Derive the relation for its efficiency.

(b) Explain the Working of SCR with two transistor equivalent circuit.

(c) Discuss the construction of UJT. What is intrinsic stand off ratio ?

6 Answer any **ONE** of the following. **1 × 4 = 4 Marks**

(a) Determine the efficiency of a bridge rectifier.

(b) If in an FET, V_{GS} = -2V, V_{DS} = 5V and I_D = 3 mA, determine the values of R_D, g_m and μ.

(c) What is the value of intrinsic stand off ratio of an UJT if the base resistors are 5kΩ and 8kΩ. Determine the voltages between its terminals if V_{BB} = 10V.

PART C

7. Answer any **TWO** of the following **2 × 2 = 4 Marks**

(a) State KVL

(b) Define node in a circuit

(c) What is a Two-Port network ?

. 8. Answer any **TWO** of the following. **2 × 6 = 12 Marks**

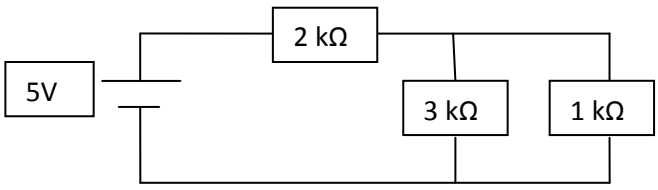
(a) Arrive at the conversion between current and voltage sources

(b) State and explain Superposition theorem.

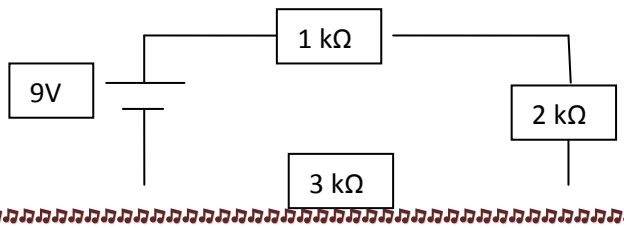
(c) Illustrate Maximum Power Transfer theorem.

9. Answer any **ONE** of the following. **1 × 4 = 4 Marks**

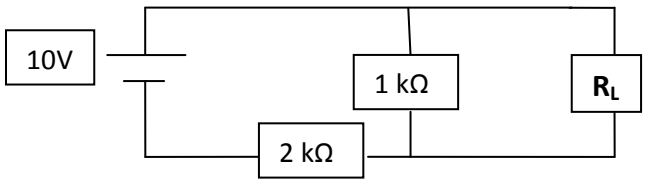
(a) Determine current through 1kΩ in the circuit. by mesh analysis



(b) Determine the Thevenin's equivalent for the given circuit



(c) Determine the Norton's equivalent across R_L for the given circuit



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