NORTH MAHARASHTRA UNIVERSITY,

JALGAON

Syllabus for

S.Y.B.Sc.

Semester I & II

ELECTRONICS

(w. e. f. June 2013)

North Maharashtra University, Jalgaon
S.Y. B.Sc.
Subject - Electronics

Syllabus Structure

Semester	Code	Title	Number of lecture
I	ELE - 231	Paper I: Analog Circuits and Applications	60
	ELE - 232	Paper II: Instrumentation	60
	ELE – 203	Paper III: Practical Course (Eight Practical)	4 period/ week
II	ELE – 241	Paper I: Linear Integrated Circuits & Applications	60
	ELE – 242	Paper II: 8085 Microprocessor	60
	ELE - 203	Paper III: Practical Course (Eight Practical)	4 period/ week

Examination Pattern:

Semester	Code	Title	Maximum Marks	
			CA	UA
I	ELE - 231	Paper I: Analog Circuits and Applications	10	40
	ELE - 232	Paper II: Instrumentation	10	40
II	ELE – 241	Paper I: Linear Integrated Circuits & Applications	10	40
	ELE – 242	Paper II: 8085 Microprocessor	10	40
	ELE - 203	Paper III: Practical Course *	20	80

*** Paper III: Practical Course Annual Assessment**

North Maharashtra University, Jalgaon
S.Y.B.Sc. Electronics
Paper I (Semester - I)
ELE 231: Analog Circuits and Applications

Unit 1: Single Stage Amplifier: (05P, 04M)

Classification of Amplifier, Single stage Common Emitter Amplifier, Tuned Amplifier, Distortion and noise in amplifier.

Unit 2: Multistage Transistor Amplifiers: (14P, 08M)

Introduction, Block diagram of multistage transistor amplifier, Application of multistage amplifier, Block Diagram of PA system, Explanation of terms - gain, frequency response, decibel gain, Bandwidth. RC-coupled transistor amplifier, two stage transformers coupled transistor amplifier, two stage Direct Coupled Amplifier.

Unit 3: Transistor Power Amplifier: (14P, 08M)

Difference between voltage and power amplifiers, Block diagram of a practical power amplifier, Classification of power amplifier, Principle of push pull amplifier, Class B Push Pull Power Amplifier operation, cross over distortion, conversion efficiency, heat sinks.

Unit 4: Feedback: (14P, 10M)

Concept of feedback, types of feedback, Topologies of feedback, Effect of negative feedback on gain, non linear distortion, Band width, Noise, Input and output impedance, (derivations are not expected). Emitter follower – operation, characteristics and applications.

Unit 5: Transistorized Oscillator (13P, 10M)

Tank Circuit, Bark Hausen criterion, Oscillator types, Phase Shift Oscillator, Hartley Oscillator, Colpitts Oscillator, Crystal Oscillator, (working, advantages & disadvantages), RF oscillator.

Reference:

1. Principles of Electronics - V. K. Mehta
2. Electronic Principles - A. P. Malvino
3. Basic Electronics & Linear Circuits - N. N. Bhargava

North Maharashtra University, Jalgaon
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Paper II (Semester - I)
ELE 232: Instrumentation

Unit 1: Analog and Digital Meters (15P, 12M)

PMMC- construction and working, DC ammeter, Calculation of shunt resistance, Ayrton multirange ammeter and numeric problems.

DC Voltmeter, Calculation of series resistance, multirange voltmeter, sensitivity, loading effect and numerical problems

Ohm-meter series type and its calibration

Idea of analog multimeter, DMM-Block diagram, working, I to V and R to V conversions

Unit 2: Basic test Instruments (14P, 10M)

Power Supply- Unregulated and regulated power supplies, Series Voltage regulator, Fixed 3 terminal voltage regulator, Load and Line regulation

Signal Generator- Block diagram and working of standard signal generator, application in laboratory.

CRO- Block diagram of general purpose CRO and function of each block. Applications – Voltage and frequency measurement

Unit 3: Transducer (14P, 08M)

Classification of Transducer – Active and Passive, Selection of transducers.

Electomechanical Transducer- Resistance pressure transducer

Thermoelectric Transducer- Thermocouple, RTD

Photoelectric Transducer: Photo-emissive –Photo Multiplier tube, Photoconductive –LDR, Photovoltaic- Solar Cell, Opto-coupler

Electro-acoustic Transducer –Condenser, Microphone, P.M Loudspeaker

Unit 4: Data converters (10P, 06M)

Need of data converters, DAC-Binary ladder network

ADC- Dual stage integration type ADC, Idea of DVM.

Unit 5: DFM (07P, 04M)

Working Principle, block diagram and working, Time –base generator, Frequency measurement and Period measurement

Reference Books:

1. Electronics Instrumentation –H.S.Kalsi(TMH)
2. Electronics Instrument& Measurement Techniques-W. D.Cooper
3. Instrumentation Devices & Systems- Rangan, Mani, Sharma, TMH
4. A course in electrical and electronic measurements and instrumentation- Sawhney A.K., Dhanpat Rai & Company.
5. Electronic Instrumentation – R.V. Jalgao

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Paper I (Semester - II)
ELE 241: LINEAR INTEGRATED CIRCUITS & APPLICATIONS

Unit 1: Differential Amplifier: (06P, 08M)

Introduction, CMRR, differential amplifier configurations (mention types with circuit diagram only), Emitter coupled differential amplifier, differential amplifier with constant current source.

Unit 2: Operational Amplifier - (14P, 08M)

Block diagram, Schematic symbol, Pin diagram (IC 741), Parameters: - Input impedance, output impedance, input offset voltage, open loop voltage gain, input bias current, slew rate. (Definitions only) Concept of offset Null arrangements Ideal characteristics of an Op-Amp, practical characteristics of an Op-Amp, inverting amplifier, concept of virtual ground, non-inverting amplifier, voltage follower.

Unit 3: General applications - (12P, 06M)

Op- Amp as Adder, Subtractor, Differentiator, integrator, Instrumentation amplifier with three Op-Amps, voltage to current converter with floating load and grounded load, Log amplifier using diode.

Unit 4: Active filters and Comparators - (14P, 08M)

Classification of filter, Active filters – Advantages, limitations and types, first order low pass and high pass active filters (Derivation of gain and designing),

Basic comparator, Schmitt trigger, comparator characteristics, Sample and Hold Circuit, Basic peak detector, precision half wave and full wave rectifier.

Unit 5: Waveform generators (14P, 10M)

Timer IC-555 and its application - Pin diagram, Functional block diagram, Concept of multivibrator, Astable Multivibrator – Operation and its applications (Square wave generator, Free running ramp generator), Monostable Multivibrator – Operation and its applications (frequency divider, pulse stretcher), Bistable Multivibrator– Operation, Voltage controlled Oscillator (VCO).

Reference Book –

1. Operational Amplifier - G. B. Clayton
2. Operational Amplifier and Linear Integrated Circuits - R. A. Gaikwad
3. Integrated Circuits - K. R. Botkar

North Maharashtra University, Jalgaon
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Paper II (Semester - II)
ELE 242: 8085 Microprocessor

Unit 1: Fundamentals of Microcomputer. (06P, 06 M)

Simple Microcomputer Architecture, Microcomputer operation, Address bus, Data bus, control bus, High level language, Low level language, Assembler, Compiler.

Unit 2: Architecture of 8085 Microprocessor. (10P, 06 M)

The 8085 pin diagram and function of each pin, Microprocessor Communication and Bus Timings, De-multiplexing the Bus AD7-AD0, Microprocessor Architecture and Function of each block.

Unit 3: Instruction set of 8085 Microprocessor. (18P, 12M)

Study of addressing mode for 8085:-Implied Addressing, Register Addressing, Immediate Addressing, Direct Addressing, Register Indirect Addressing , Instruction set:- Data transfer Instructions, Arithmetic Instructions, Logical Instructions, Branching Instructions, Stack, I/O and Machine Control Instructions.

Unit 4: Assembly Language Programming. (16P, 10M)

Arithmetic Programs: - 8-bit addition, 8-bit subtraction, Decimal addition and subtraction of two 8-bit numbers, 8-multiplication, one's and two's complement of 16-bit numbers, find largest and smallest Number from a series of given number. **Code Conversion Programs:-** Hex to ASCII conversion , BCD to binary conversion.

Unit 5: The 8255A Programmable Peripheral Interface. (10P, O6M)

Block diagram of the 8255A, Control word format, Input/ Output mode, BSR (Bit Set/Reset) Mode.

References:

1. Fundamentals of Microprocessors and Microcomputers – **Badri Ram, Dhanpat Rai and Sons, Delhi.**
2. 8085 Assembly Language Programming – **L. A. Leaventhal**.
3. Microprocessor Architecture Programming and Applications 8080 & 8085 – **Ramesh Gaonkar.**
4. Advance Microprocessor and peripherals (Architecture, Programming and interfacing) – **A. K. Ray, K. M. Bhurchandi.**

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Paper – III ELE-203- Practical

Semester I:

Group A (Any four)

1. Design, Build and test Single stage Common Emitter Amplifier.
2. Design, Build and test RC-coupled transistor Amplifier.
3. Study of PA system.
4. Build and test Class B Push Pull Amplifier.
5. Build and test Emitter follower using Transistor.
6. Build and test Phase Shift oscillator for given frequency using Transistor.
7. Design, build and test Crystal Oscillator using Transistor.

Group B (Any four)

1. Design of DC ammeter.
2. Design of DC Voltmeter.
3. Regulated Power Supply using 78XX.
4. Design of Temperature to Frequency Convertors using OP-Amp/timer and Thermistor.
5. Optocopler using LED and LDR
6. DAC using R-2R Network
7. Dual Power Supply using 78XX and 79XX.

Semester II:

Group C (Any four)

1. Study of parameter of OP-amp (Input and output Impedance, Frequency Response).
2. Build and test adder and subtractor using OP-Amp.
3. Design, Built and test V-I Convertor using OP-Amp (Grounded Load).
4. Design, Built and test Low Pass Active Filter using OP-Amp.
5. Design, Built and test Square and triangular Wave generator.
6. Study of Log Amplifier using diode and Op-Amp.
7. Design, Built and test Astable Multivibrator using IC 555.

Group D (Any four)

1. Write an Assembly Language Program to add and subtract two hexadecimal numbers
2. Write an Assembly Language Program to multiply 8-bit unsigned number by 8-bit unsigned number.
3. Write Assembly Language Program to divide 16-bit unsigned number by 8-bit unsigned.
4. Write an Assembly Language program to convert the hex number into an ASCII character.
5. Write a program in Assembly Language to find smallest and smallest number from a series of number.
6. Write an Assembly Language program to convert BCD number into hexadecimal number.
7. Write a program to calculate the sum series of number.