Gondwana University, Gadchiroli

Proposed Syllabus

B.Sc. I

Subject: Electronics

Semester I & II

Board of Studies - Electronics

Gondwana University Gadchiroli

Scheme of Bachelor of Science for Semester Examination

Gondwana University, Gadchiroli

Subject: Electronics

Class	Semester	Paper	Teaching Scheme Per Week			Examination Scheme			
			Theory	Total	Practical	Theory Marks		Practical Marks	Total Marks
						Paper	Internal Assessment		
B. Sc. I	I	I	3	6 + 1T*	6	50	20	30	150
		II	3			50			
	II	I	3	6 + 1T*	6	50	20	30	150
		II	3			50			
B. Sc. II	III	I	3	6 + 2T*	6	50	20	30	150
		II	3			50			
	IV	I	3	6 + 2T*	6	50	20	30	150
		II	3			50			
B. Sc. III	V	I	3	6 + 2T*	6	50	20	30	150
		II	3			50			
	VI	I	3	6 + 2T*	6	50	20	30	150
		II	3			50			

* Periods for Tutorials per batch.

Pattern of Question Papers (UG)

Time : **3 Hours**

Maximum marks : **50**

Question No.	**Marks Allotted**
Qu. 1 Either	
From Unit - I	10
Or	
From Unit – I	10
Qu. 2 Either	
From Unit - II	10
Or	
From Unit – II	10
Qu. 3 Either	
From Unit –III	10
Or	
From Unit –III	10
Qu. 4 Either	
From Unit – IV	10
Or	
From Unit – IV	10
Qu. 5	
a) From Unit - I	2.5
b) From Unit - II	2.5
c) From Unit - III	2.5
d) From Unit - IV	2.5

The above pattern is for all two papers of each semester of B.Sc. I, w.e.f. 2012-13 & B.Sc. II and B.Sc. III from next subsequent years.

Chairman BOS, Electronics
Dr V. D. Bhandarkar,

Details of the Syllabus

First Year B.Sc.

Subject: Electronics

Scheme for Semester I

W.E.F. 2012-13

Paper	No. of Periods per week (48 minutes each)			Marks			
	Lecture	Practical	Tutorial	Theory	Internal Assessment	Practical	Total
Paper – I Basic Electronics and Semiconductor Devices	3	6	1	50	20	30	150
Paper – II Transducers and Network Theorems	3			50			

Paper I (Semester-I)

Basic Electronics and Semiconductor Devices

Unit - I

Introduction of Passive Components:-

Resistor: types, Construction and properties of carbon composition, wire-wound, film resistor.

Resistors in series and parallel.

Variable resistor: - Potentiometer, Rheostat and preset.

Capacitor: Construction and properties of paper, mica, ceramic and electrolytic.

Capacitors in series and parallel

Inductor: Concept of self and mutual inductance. Construction and properties of air core, iron core and ferrite core.

Transformer: Construction and working, Types step-up and step down, power, isolation, auto transformer

Unit - II

Concept of band diagram (Insulator, conductor and semiconductor)

Intrinsic and extrinsic semiconductor, PN junction, forward and reverse bias characteristics of PN junction, transition capacitance, diffusion capacitance, Zener Diode, breakdown mechanism (Avalanche effect, Zener effect). Diode as a half-wave, full-wave and bridge rectifier.

Unit- III

Construction and characteristics of BJT : NPN and PNP transistor, CB, CE & CC configuration, leakage currents, Input and output characteristics of CE mode, relation between □□and β, Load line (DC only) and operating point, amplification action of CE amplifier (Simple numerical expected)

Unit- IV

Construction, working and characteristics of J-FET, comparison of BJT and FET, parameters of JFET, JFET as an amplifier (common source). Construction and working of MOSFET (depletion and enhancement), advantages and disadvantages of MOSFET

Construction, working and characteristics of SCR, SCR as a switch.

Construction, working, characteristics and advantages of TRIAC, DIAC and UJT.

Paper II (Semester-I)

Transducers and Network Theorems

Unit- I

Concept of transducer needs of transducers, definition of active and passive transducer, and classification of transducer. Thermister, thermocouple, LVDT and piezoelectric transducer, strain gauge, capacitive transducer, microphone and loudspeaker.

Unit- II

Construction and characteristics of optoelectronic devices: - Photovoltaic cell, photoconductive cell, Solar cell, LDR, LED, LCD (dynamic scattering and field effect type), LASER diode.

Unit- III

Ideal voltage and current sources (AC and DC). Concept of node, mesh, loops in network, voltage divider and current division method/Law Kirchhoff's voltage law, Kirchhoff's current. Transformation of energy sources. Statement and proof of Superposition theorem (simple numerical with DC sources only)

Unit- IV

Statement, explanation and proof of Thevenin's theorem, Norton's theorem , Millman's theorem, dual of Millman's theorem and maximum power transfer theorem, (simple numerical with DC sources only).

Internal Assessment (20 marks)

	Marks
Attendance	05
Home assignment	
Completion	05
Record	02
Seminar	05
Group discussion	03

PRACTICALS (conducted by internal examiner)

It is divided into two sections i.e. Section-A and Section-B. At least five experiments from each section must be performed and the practical record book duly signed should be submitted at the time of examination. Each student is expected to perform one experiment from each section, in the University Examination. The duration of practical examination is six hours.

Marks Distribution:

	Record	Experiment	Viva	Total
Section – A	3	9	3	15
Section – B	3	9	3	15
			Total	30

Section A

1. Identification and testing of various electronic components.
2. Study of transformer.
3. Study of forward biased characteristics P-N junction (Ge / Si / LED) diode.
4. Study of reverse biased characteristics of Zener diode.
5. Study of half wave (HWR) rectifier with varying load.
6. Study of full wave (FWR) rectifier with varying load.
7. Study of bridge (FWR) rectifier with varying load.
8. Study of BJT in CE mode.
9. Study of FET characteristics.
10. Study of SCR characteristics.
11. Study of DIAC characteristics.
12. Study of TRIAC characteristics.

Section B

1. Study of L.D.R. characteristics.
2. Study of Thermister (NTC/PTC) characteristics.
3. Study of LVDT characteristics.
4. Study of microphone and loudspeaker.
5. Study of photovoltaic cell.
6. Study of Kirchhoff's voltage law.
7. Study of Superposition theorem.
8. Study of Thevenin's theorem.
9. Study of Maximum power transfer theorem.
10. Study of Millman's theorem.

Note: An Industrial visit / Study tour should be arranged for the student after semester-I.

Reference Books

1. Basic electronics – Grob
2. Basic electronics – B.L. Thereja
3. Principle of electronics - V. K. Mehta
4. Electronic Devices and Circuits- Allen Mottershed
5. Electronics, fundamental and Application – Ryder
6. Electronics, Discrete and integrated Circuits – Y.M.Bapat
7. Basic electronics Linear Circuits – R.N.Bhargawa
8. Principle Electronics - Malvino
9. Elements of Electronics – Bagade & Singh
10. Electronic and Electrical Measurement and instrumentation- A. K. Sawhney
11. Electronics Instrument and Measurement Technology –W.D.Cooper
12. Network Analysis G.K. Mittal

Gondwana University, Gadchiroli

First Year B.Sc. Subject:

Electronics Scheme for

Semester II

W.E.F. 2012-13

Paper	No. of Periods per week (48 minutes each)			Marks			
	Lecture	Practical	Tutorial	Theory	Internal Assessment	Practical	Total
Paper – I Digital Electronics and Computer Fundamentals	3	6	1	50	20	30	150
Paper – II Measuring Devices	3			50			

Details of the Syllabus

Paper I (Semester-II)

Digital Electronics and Computer Fundamentals

Unit-I

Number system – decimal, binary, octal, hexadecimal, representation of integer fraction and mixed number and their mutual conversion

Complement number – 1's and 2's complement, subtraction by 1's and 2's complement, 9's and 10's complement, subtraction by 9's and 10's complement.

Sign magnitude number: 1's and 2's Complement representation.

Unit-II

Codes – BCD-8421, Excess 3, parity code and grey code

Basic logic gate – NOT, OR, AND

Universal gates NOR and NAND,

EX-OR and EX-NOR gate and their truth tables. Application of EX-OR gate as controlled inverter.

Boolean laws: basic laws, simplification, Statement and proof of Demorgan's theorem and duality theorem.

Unit-III

Logic families: Classification of logic families, characteristics (Fan-in, Fan-out, Noise immunity, propagation delay, Power dissipation. Construction and working of TTL NAND and NOR gate, construction and working of CMOS NAND and NOR gates, concept of tristate logic, Comparison of TTL and CMOS logic families with respect to propagation delay, power consumption, noise immunity, fan in and fan out.

Unit-IV

Block diagram of computer, function of each block, types of computer (digital, analog and hybrid), classification of computer, computer generation.

Input devices - key board, mouse, scanner

Output devices – printer: - lines, character (Dot matrix), page (LASER).

I/O devices – Pen drive, hard disk, optical disk.

Application of computer

Semester-II

Paper II

Measuring Devices

Unit- I

Introduction to galvanometer (PMMC), conversion of PMMC to voltmeter, ammeter, ohmmeter (Series and shunt). Concept of loading effect and sensitivity, concept of multimeter. (Simple numerical expected)

Unit-II

Construction and working of EVM using FET.

Construction, working and advantages of digital multimeter.

Brides - general condition of balance of AC bridge, Owen bride Schering bridge. (simple numerical expected)

Unit-III

Block diagram of CRO, CRT diagram, electrostatic focusing, deflection sensitivity, and horizontal and vertical deflection system. Time base circuit using UJT, needs of delay line. Concept of synchronization.

Unit-IV

Applications of CRO for voltage, frequency and phase measurement. Concept and block diagram of dual trace CRO. CRO probes (passive only), comparison of dual trace and dual beam CRO.

Internal Assessment (20 marks)

	Marks
Attendance	05
Home assignment	
Completion	05
Record	02
Seminar	05
Group discussion	03

PRACTICALS (conducted by internal and external examiner)

It is divided into two sections i.e. Section-A and Section-B. At least five experiments from each section must be performed and the practical record book duly signed should be submitted at the time of examination. Each student is expected to perform one experiment from each section, in the University Examination. The duration of practical examination is six hours.

Marks Distribution:

	Report	Experiment	Viva	Total
Section – A	3	9	3	15
Section – B	3	9	3	15
			Total	30

Section A

1 Study of basic logic gate.
2 Study of NAND gate as a universal gate
3 Study of NOR gate as a universal gate
4 Study of Ex – OR gate
5 Study of Ex – NOR gate
6 Verification of truth Table for given Boolean expression.
7 Study of Demorgan's theorem
8 Study of Input devices: Keyboard and Mouse.
9 Study of Input devices: Scanner and Printer.

Section B

1. Study of Series type Ohmmeter
2. Study of Shunt type Ohmmeter
3. Study of DC multirange Ammeter.
4. Study of DC multirange Voltmeter.
5. Study of loading effect in Voltmeter (DC only).
6. Study of Schering Bridge.
7. Study of Owen's bridge.
8. Study/Use of CRO for measurement of voltage and frequency.
9. Study/Use of CRO for determination of frequency and phase.

Reference Books

1. Digital and Analogue technique – Kale & Navaneet
2. Digital Principle and application – Malvino & Leach
3. Modern digital electronics – R.P. Jain
4. Electronics devices & circuits –Jocob Milliman & C.C. Hulkiyas
5. Introduction to Computer –Rajaraman
6. Introduction to Computer Science: –Satish Jain
7. Computer Fundamentals – P. K. Sinha
8. Electronics Instrument and Measurement Technology –W.D.Cooper
9. Electronic and Electrical Measurement and instrumentation- A.K. Sawhney
10. Basic electronics – B.L. Thereja
11. Modern Electronics Equipment: Trouble Shooting Repair and Maintenance: R.C. Khanpur.

B) Absorption scheme:

1. While switch over to the semester system, failure students should get three chances to clear yearly pattern.
2. To get admission in the third semester students should clear first semester including theory as well as practical
1. First year annual pattern students shall get admission to third semester directly.

C) Grade Point Average (GPA) and Course Grade Point Average (CGPA)

On clearing a paper, based on the cumulative score (out of 100) in that paper, a student will be given Grade Point Average (GPA) (Maximum of 10 and minimum of 4) for that paper on the following basis:

Score (out of 100)	**Grade point average (Out of 10)**
90 to 100	10
80 to 89	09
70 to 79	08
60 to 69	07
55 to 59	06
50 to 54	05
40 to 49	04
Below 40	00 or fail

On clearing all the papers in a semester, a student will be allotted a Semester Grade Point Average (SGPA) for that particular semester. As the pattern given above does not have differential weights for papers, the SGPA of a student for a particular semest er will be the average of the GPA' s for all the papers.

A student will be allotted a Course Grade Point Average (CGPA) after clearing all the four semesters. Again as there is no differential weight system for semesters, the CGPA of a student will be the average of the four SGPA's of that student.

The CGPA can be converted to the usual/conventional divisions in the following way:

CGPA	**Equivalent class/division**
9.00 to 10.00	First class (outstanding)
8.00 to 8.99	First class (excellent)
7.00 to 7.99	First class with distinction
6.00 to 6.99	First class
5.50 to 5 .99	Higher second class
5.00 to 5.49	Second class
4 .00 to 4.99	Pass class
Below 4.00	Fail