Gondwana University, Gadchiroli

Scheme of Examination

&

Syllabus

For Semester Pattern with Credit Based System

in

M. Sc. Electronics

(Under the Faculty of Science)

Approved by the Board of Studies in Electronics

Effective from the session 2012-2013 and subsequently

Appendix-1

Scheme of teaching and examination under credit based semester pattern for M.Sc. Electronics

Sr.No.	Semester	Theory Paper/ Practical	Teaching Scheme (Hrs/week)			Credits	Examination Scheme						
			Th.	Pr.	Total		Duration (Hrs)	Max. Marks		Total Marks	Min. Passing Marks		
								External Marks	Internal Marks		Th.	Int.	Pr.
1	I	I	4	--	4	4	3	80	20	100	32	08	--
2	I	II	4	--	4	4	3	80	20	100	32	08	--
3	I	III	4	--	4	4	3	80	20	100	32	08	--
4	I	IV	4	--	4	4	3	80	20	100	32	08	--
5	I	Practical I	--	8	8	4	3-8*	80	20	100	--	--	40
6	I	Practical II	--	8	8	4	3-8*	80	20	100	--	--	40
7	I	Seminar	2	--	2	1	--	--	25	25	10		
		Total	18	16	34	25	--	--	--	625			
8	II	I	4	--	4	4	3	80	20	100	32	08	--
9	II	II	4	--	4	4	3	80	20	100	32	08	--
10	II	III	4	--	4	4	3	80	20	100	32	08	--
11	II	IV	4	--	4	4	3	80	20	100	32	08	--
12	II	Practical I	--	8	8	4	3-8*	80	20	100	--	--	40
13	II	Practical II	--	8	8	4	3-8*	80	20	100	--	--	40
14	II	Seminar	2	--	2	1	--	--	25	25	10		
		Total	18	16	34	25	--	--	--	625			
15	III	I	4	--	4	4	3	80	20	100	32	08	--
16	III	II	4	--	4	4	3	80	20	100	32	08	--
17	III	III	4	--	4	4	3	80	20	100	32	08	--
18	III	IV	4	--	4	4	3	80	20	100	32	08	--
19	III	Practical I	--	8	8	4	3-8*	80	20	100	--	--	40
20	III	Practical II	--	8	8	4	3-8*	80	20	100	--	--	40
21	III	Seminar	2	--	2	1	--	--	25	25	10		
		Total	18	16	34	25	--	--	--	625			
22	IV	I	4	--	4	4	3	80	20	100	32	08	--
23	IV	II	4	--	4	4	3	80	20	100	32	08	--
24	IV	III	4	--	4	4	3	80	20	100	32	08	--
25	IV	IV	4	--	4	4	3	80	20	100	32	08	--
26	IV	Practical I	--	8	8	4	3-8*	80	20	100	--	--	40
27	IV	Project	--	8	8	4	3-8*	80	20	100	--	--	40
28	IV	Seminar	2	--	2	1	--	--	25	25	10		
		Total	18	16	34	25	--	--	--	625			

Total Marks: 2500 Credits: 100

Note:

1. Minimum marks for passing 32 out of 80 in each theory paper
2. Minimum marks for passing 40 out of 100 in each practical
3. Minimum marks for passing 10 out of 25 in seminar
4. Minimum marks for passing 08 out of 20 in each internal(Int.) assessment

Absorption scheme:

1. While switch over to the semester system, failure students should get three chances to clear yearly pattern.
2. First year annual pattern students shall get admission to third semester directly.

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 semester 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

Syllabus

M. Sc. Electronics
Semester I

Code	Paper	Theory Marks	Internal Marks	Total Marks	Credits
ELE 101	Fundamentals of Semiconductor Devices	80	20	100	4
ELE 102	Digital Design and Applications	80	20	100	4
ELE 103	Advanced Microprocessors	80	20	100	4
ELE 104	Programming in C	80	20	100	4

Practicals

Code	Practical	Practical Marks	Internal Marks	Total Marks	Credits
ELE 1P1	Lab Course I- Analog and Digital Electronics Lab	80	20	100	4
ELE 1P2	Lab Course II- Computer Interfacing and Programming in C	80	20	100	4
	Seminar	25	--	25	1

Semester II

Code	Paper	Theory	Internal	Total Marks	Credits
ELE 201	Embedded Systems and Applications	80	20	100	4
ELE 202	Biomedical Instrumentation	80	20	100	4
ELE 203	Computer Organization and Interfacing	80	20	100	4
ELE 204	Virtual Instrumentation	80	20	100	4

Practicals

Code	Practical	Practical Marks	Internal Marks	Total Marks	Credits
ELE 2P1	Lab Course III – Microcontroller and Interfacing	80	20	100	4
ELE 2P2	Lab Course IV- Virtual instrumentation and Programming in Lab VIEW	80	20	100	4
	Seminar	25	--	25	1

Semester III

Code	Paper	Theory Marks	Internal Marks	Total Marks	Credits
ELE 301	Network Analysis and Synthesis	80	20	100	4
ELE 302	Fuzzy Logic and Artificial Neural Networks	80	20	100	4
ELE 303	Digital signal Processing	80	20	100	4
ELE 304	Mechatronics	80	20	100	4

Practicals

Code	Practical	Practical Marks	Internal Marks	Total Marks	Credits
ELE 3P1	Lab Course V- Fuzzy Logic and Artificial Neural Network	80	20	100	4
ELE 3P2	Lab Course VI- Digital Signal and Image Processing	80	20	100	4
	Seminar	25	--	25	1

Semester IV

Code	Paper	Theory Marks	Internal Marks	Total Marks	Credits
ELE 401	Electromagnetic Fields and Antennas	80	20	100	4
ELE 402	Digital Communication	80	20	100	4
ELE 403	Microwave and Optical Communication	80	20	100	4
ELE 404	Mobile and Satellite Communication	80	20	100	4

Practicals

Code	Practical	Practical Marks	Internal Marks	Total Marks	Credit
ELE 4P1	Lab Course VII – Communication Lab	80	20	100	4
ELE 4P2	Project and Seminar	80	20	100	4
	Seminar	25	--	25	1

M. Sc. (Electronics)
Semester III
Paper I (ELE 301): Network Analysis and Synthesis

Unit I: Network Analysis

Mesh analysis, mesh equations, super-mesh analysis, nodal analysis, nodal equations, source transformation technique, state variable analysis

Unit II: Network Theorems and Applications

Star-delta transformations; Superposition, Thevenin's, Norton's and reciprocity theorems, duals and duality, Tellegen's and Millman's theorem

Unit III: Laplace Transform and Properties

Laplace transformation, properties of Laplace transforms, partial fraction expansion, Heaviside's expansion theorem: illustrative examples

Unit IV: Network Functions and synthesis Techniques

One-port and two-port networks, poles and zeors of network functions, time domain behavior from the pole zero plot; stability of active networks, Hurwitz polynomials, positive real functions, Ruth-Hurwitz array and R-H criteria, Foster and Cauer methods of synthesis of RC and LC networks

Books:

1. Network Analysis: M. E. Van Valkenberg, PHI, New Delhi
2. Circuits and Networks: Analysis and Synthesis: A. Sudhakar and S. P. Shyammohan, Tata McGraw Hill, New Delhi

M. Sc. (Electronics)
Semester III

Paper II (ELE 302): Fuzzy Logic and Artificial Neural Networks

Unit- I: Fuzzy sets and Membership functions

Fuzzy set operations, properties of fuzzy sets, fuzzy relations, features of the membership function, Lambda – cuts, De-Fuzzification methods

Unit - II: Extension principle, Approximate reasoning, Representing set of rules, fuzzy rule-based systems. Graphical techniques of inference; Fuzzy classification, Fuzzy c-means clustering (FCM)

Unit- III: Fundamental concepts of ANN

Model of an artificial neural network (ANN), Network architectures, feed forward networks, Learning processes, Delta learning rules for multi-perception layer, back propagation algorithm

Unit- IV: Associative memories and self organizing networks:

Basic concepts and performance analysis of recurrent associative memory, bidirectional associative memory (BAM); the counter-propagation network (CPN), self-organizing feature maps, Adoptive Resonance Theory (ART-I)

References:

1. Fuzzy Logic with Engineering Applications: Timothy J. Ross, McGraw Hill, Inc.
2. Neural Networks, A comprehensive Foundation: Simon Haykin, Pearson Education, Asia

Other Books:

1. Neural networks: Algorithms, applications & Programming Techniques: J.A. Freeman & D. M. Skapura, Pearson Education Asia
2. Artificial Neural Networks: K. Mehrotra, C. K. Mohan & Sanjay Ranka, Penram International Publications, New Delhi
3. Introduction to Artificial Neural Systems: J. M. Zurada, Jaico Publishing House, New Delhi

M. Sc. (Electronics)
Semester III

Paper III (ELE 303): Digital signal Processing

Unit I: Discrete-time Signals and Systems

Discrete time signals, basic sequences and sequence operations, D-T systems, moving average, time-invariance, linearity, causality, stability criterion, properties of linear time-invariant systems; Linear convolution, linear constant-coefficient difference equations

Unit II: The z-transform

Definition, region of convergence (RoC), pole zero plot and region of convergence, properties of region of convergence, the inverse z-transform, power series expansion, z-transform properties

Unit III: Digital Filter Design

Design of D-T IIR filters from continuous time filters, frequency transformations of low pass IIR filters; Design of FIR filters by windowing technique, the Kaiser Window filter design method, design procedure using frequency sampling method

Unit IV: DSP Chips and Applications

Introduction to DSP processors, types of DSP processors and architecture, general purpose DSP processors; Digital filter design using DSP chips, implementation of noise removal techniques, echo effect introduced in music

Practicals:

1. Study of some discrete- time signals
2. Design and study of some FIR filters
3. Study of triangular and Blackman windows
4. Design of FIR filters using windowing technique
5. Design of filters based on pole-zero placements
6. Study of linear convolution
7. Design and study of FFT using programming
8. Design and study of digital filters (HF and LF) using programming
9. Study of experiments based on DSP chips

Books:

1. Digital Signal Processing: N. G. Palan (Tech Max Publications, Pune)
2. DSP Processor Fundamentals: Architectures and Features: Phil Lapsley, Jeff Bier, Amit Shoham & Edward A. Lee
3. Discrete Time Signal Processing: Allen V. Oppeheim & Ronal W. Schafer (PHI, New Delhi)
4. Introduction to Digital Signal Processing: Roman Kuc (MGH)
5. Digital Signal Processing- Principles, Algorithms and Applications: J. G. Proakis and D. G. Manolakis (PHI, New Delhi)

References:

1. Introduction to Digital Signal Processing: Johny R. Johnson (PHI, New Delhi)
2. Digital Signal Processing: Sanjit K. Mitra (TMH, New Delhi)
3. Signal Processing using MATLAB: C. Sidney Burrus, J. K. Mc Clellan, A. V. Oppenheim, R. W. Schafer and H. W. Schuessler
4. Digital Filtering: An Introduction – Edward P. Cunningham

M. Sc. (Electronics)
Semester III
Paper IV (ELE 304): Mechatronics

Unit I: Basic Elements of a Mechatronics system

General introduction to Mechatronics systems, traditional and Mechatronics designs, control systems, open and closed-loop systems, sensors and transducers; performance parameters of transducers, static and dynamic characteristics, potentiometer sensor, LVDT, push-pull displacement sensor, eddy current proximity sensors, optical encoders

Unit II: Basic System Models

A mathematical model of a system, elements in mechanical system, mass, moment of inertia, elements in electrical systems, resistors, capacitors, inductors, comparison of elements in these systems and their defining equations, dynamic responses of systems: examples of first order systems

Unit III: System transfer Functions

Conversion of differential equation into Laplace transform, transfer function of R-C series circuit, first order system with step input: illustrative examples, systems with negative feedback, location of poles on the s-plane, poles of stable and unstable systems, frequency response of a system of sinusoidal input, phasor equations, frequency response for a first-order system, Bode plots

Unit IV: Closed-loop controllers

Lag, steady-state error, control modes, electronic proportional controller, system response, PD and PI control, PID controller, digital controllers, controller tuning, process reaction method, ultimate cycle method, Ziegler and Nichols criterion, adaptive control, self-tuning

Reference:

1. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, William Bolton, Pearson Education Publishers, New Delhi